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Number 6.

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$3.00 with Directory.

TEXTILE WORLD RECORD

LORD & NAGLE COMPANY · Boston & Philadelphia

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Report of the fall meeting of the National Cotton Manufacturers' Association at Lake Champlain in this number.

The Textile-Finishing Machinery Co.

17 EXCHANGE PLACE, PROVIDENCE, R. I.

Singeing Machines,

Boiling Kiers,

Washers, Squeezers,

Chemic and Sour

Rusden Patent

Continuous Chainless

Steamer,

Aniline Agers,

Dyeing Machines,

Open Soapers,

Blanket Washers,

Color Kettles,

Horizontal or Vertical Drying Machines, with Copper or Tinned Iron Cylinders,

Automatic Tentering Machines,

Water and Starch Mangles,

Dampening Machines,

Dyeing Machines for Chain Warps.

BUILDERS OF ALL KINDS OF

MACHINERY

FOR

BLEACHING
DYEING
DRYING

AND

FINISHING

Calenders for Rolling, Glazing, Chasing and Embossing, also Calenders for Moire Finish.

Sole Manufacturers of Patented Flexible Cloth Expander for Cylinder Drying Machines, Calenders, Mangles, &c.

Patent Combination Rolls Made of Cotton and Husk, especially adapted for Soft Finish, Unequalled for Elasticity and Durability.

Cotton, Paper, Husk, Chilled Iron, Brass and Rubber Rolls, Electro-deposited Copper Rolls for all Purposes.

Padding and Drying Machines for Shade Cloths.

Single and Double Cylinder Engines.

Hydraulic Presses and Pumps.

Mercerizing Machinery for Piece Goods and Yarn in the Warp or Chain

ALL KINDS OF OUTFITS FOR BLEACHING THREAD AND SOFT TWISTED YARN.
BLEACHING MACHINERY FOR YARNS IN THE WARP OR CHAIN.

Estimates, Drawings and full particulars of complete plants furnished on application.

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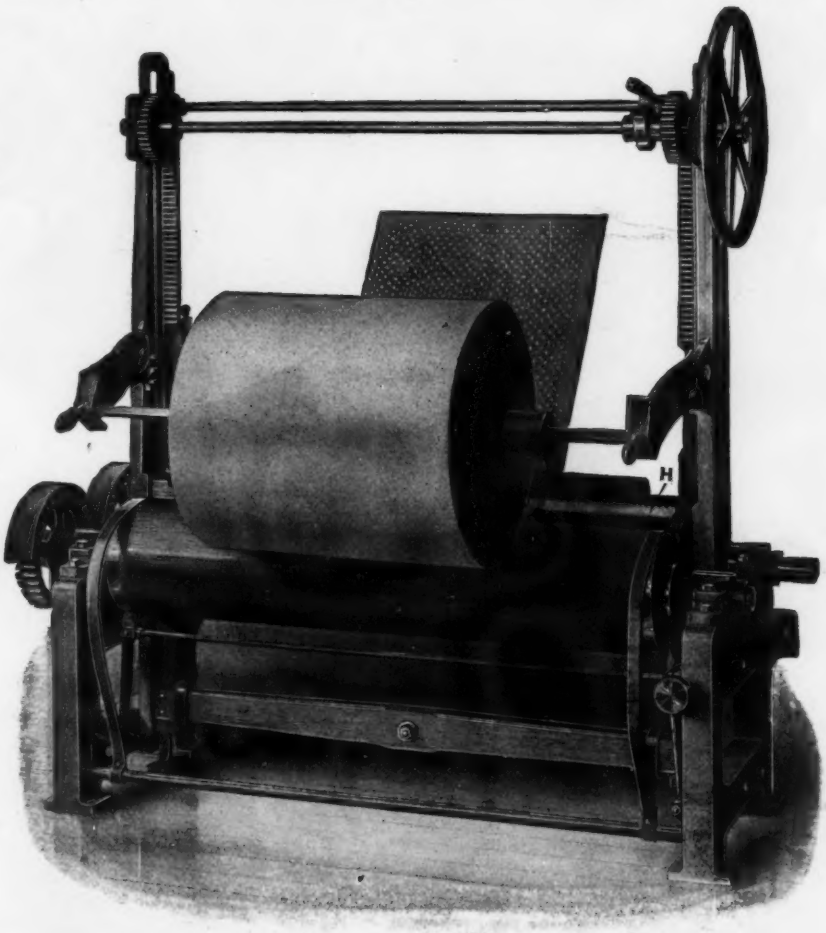
Better winding at less cost

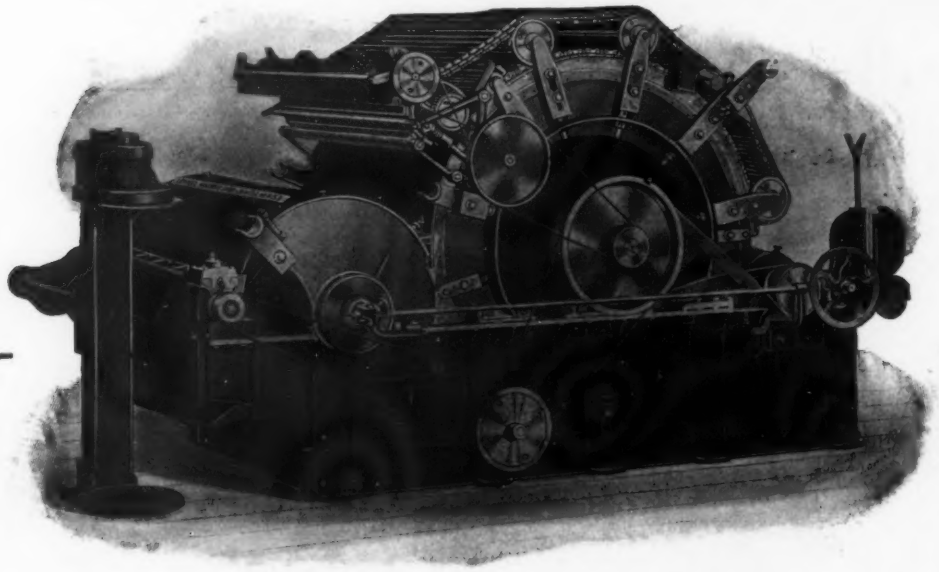


Simpson's Cloth-Winder Saves Shrinkage.

It begins the new roll smooth and keeps the cloth to its full width. Keeps the cloth clean—saves refinishing forty or fifty yards that are usually soiled by the ordinary methods. Cuts the cloth right to the seam—no waste there. Saves the time and health of your men. Send for descriptive circular, which shows how simple a machine it is.

Usually pays for itself the first year.

H. W. Butterworth & Sons Co., York and Cedar Sts., Philadelphia.



Cotton and Worsted Machinery

With Modifications to Suit Any Class of Work.

Cotton Machinery: Cards, Railway Heads, Drawing Frames, Fly Frames, Speeders, Ring Spinning Frames, Twisters, Spoolers, Reels, Warpers, Slashers, Winders, Looms, Shearing Machines, Balling Machines, Folders, Stamping Machines, Sewing Machines, Size Pumps, Size Kettles, Drawing-in Frames, Baling Presses, Indigo Grinders.

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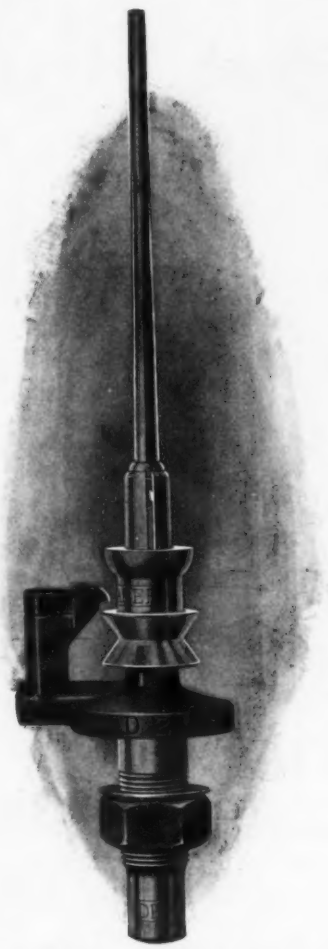
Plans, Specifications and Estimates furnished upon application.

Lowell Machine Shop

LOWELL, MASS.

A New Spindle Improvement



The Rabbeth Centrifugal Bobbin Clutch.

Fits the Bobbin loosely when at rest—allows considerable variation in fit.

Bobbins will all go down into place and Traverse can be lengthened.

Allows easier and quicker doffing — stronger bobbins — less reaming.

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We Also Build Looms.

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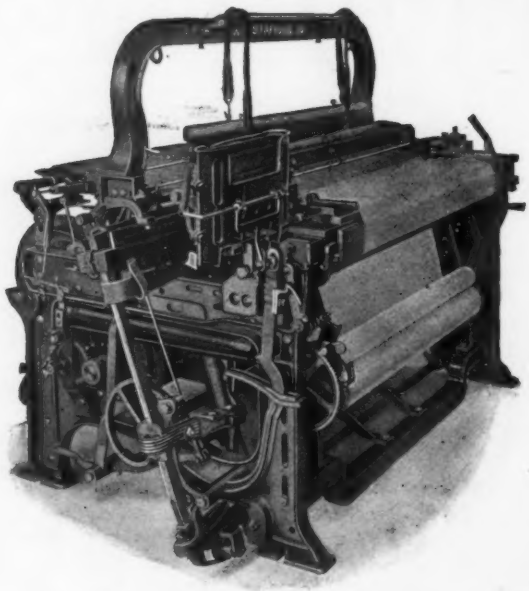

Ideal Automatic Loom

History Repeats Itself

Our previous successful efforts in the line of improvements in weaving machinery have culminated in our new

IDEAL AUTOMATIC LOOM

Considering quantity of goods produced per weaver, quality of goods, cost of supplies, repair bills, etc., there is no other loom can compare with it for economy of operation.

Cop or bobbin filling may be used equally well. One weaver can operate successfully from twelve to thirty looms, and under favorable conditions even more. No reduction in speed. A high grade plain loom as a basis.

Write for further particulars

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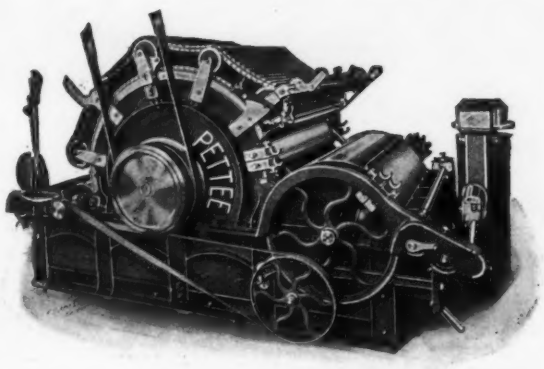


Pickers,
Revolving
Flat Cards,
Drawing
Frames,
Railway Heads,
Slubbing,
Intermediate
and
Roving
Frames,
Spinning Frames,
Spoolers
and
Reels.

Shops—

Biddeford, Me.

Newton Upper Falls, Mass.

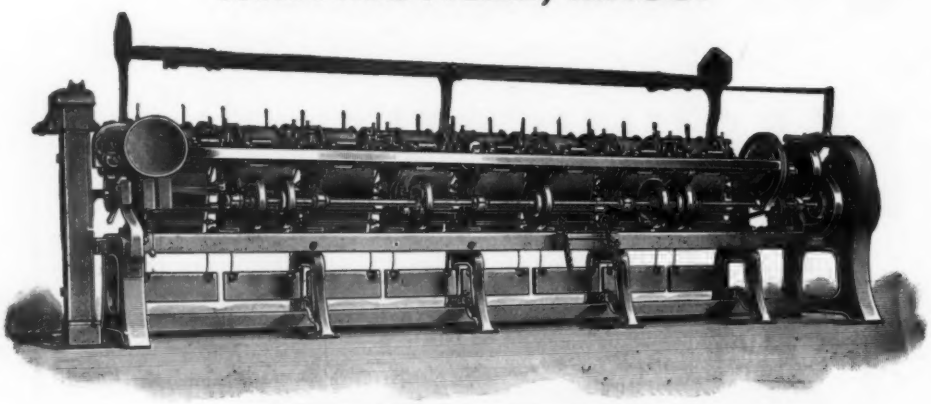
Southern Agent, A. H. WASHBURN, Charlotte, N. C.

THE

WHITIN MACHINE WORKS,

Cotton Machinery

WHITINSVILLE, MASS.



The Whitin 8 Head Comber.

Revolving Flat Carding Engines,
Combers,
Sliver Lap Machines, Ribbon Lap Machines,
Railway Heads,
Drawing Frames, Spinning Frames,
Spoolers, Twisters,
Long Chain Quilling Machines,
Reels, Looms.

Southern Agent,
S. W. CRAMER

Trust Building, CHARLOTTE, N. C.
Equitable Building, ATLANTA, GA.

"Kitson Products"

Blowing Systems

For Conveying Bale Cotton
from Storehouse to Picker-room

Self-Feeding Openers
Lappers and
Cleaning Trunks

Waste-Working Machinery

Raw Stock Cotton Dryers

We own the Patterns and can furnish REPAIR PARTS for PICKERS
formerly built by

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ATHERTON MACHINE CO., - - Lowell, Mass.
A. T. ATHERTON MACHINE CO., Pawtucket, R. I.

Kitson Machine Shop

Lowell, Mass.

SCOTT & WILLIAMS

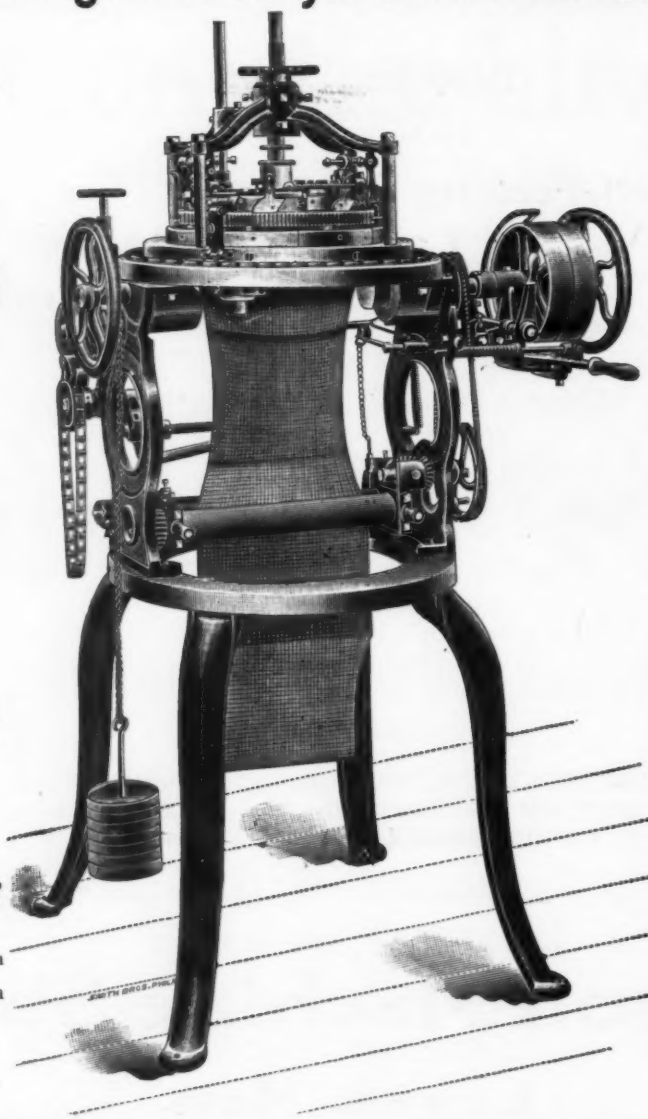
BUILDERS OF

Rib Knitting Machinery for Underwear and Hosiery

The illustration shows our

Improved High Speed Single Lever Automatic Ribbed Underwear Machine

for making ladies' and gents' ribbed underwear, union suits, etc., plain and shaped.



Plain, Single Lever or with Welt, Slack Course and Automatic Slackening Device for Welt.

Improved Measuring Device, by actual length knit.

Sizes. 8 to 24 inches, inclusive, varying by one inch.

Number of Feeds, four to 12, according to style and diameter of machine.

Solid Forged Steel Cylinders, specially hardened or with patent inserted walls for fine fabric.

Special Machinery for Sweaters etc.

We build Loopers, Ribbers and other Machinery for Knitting Mills

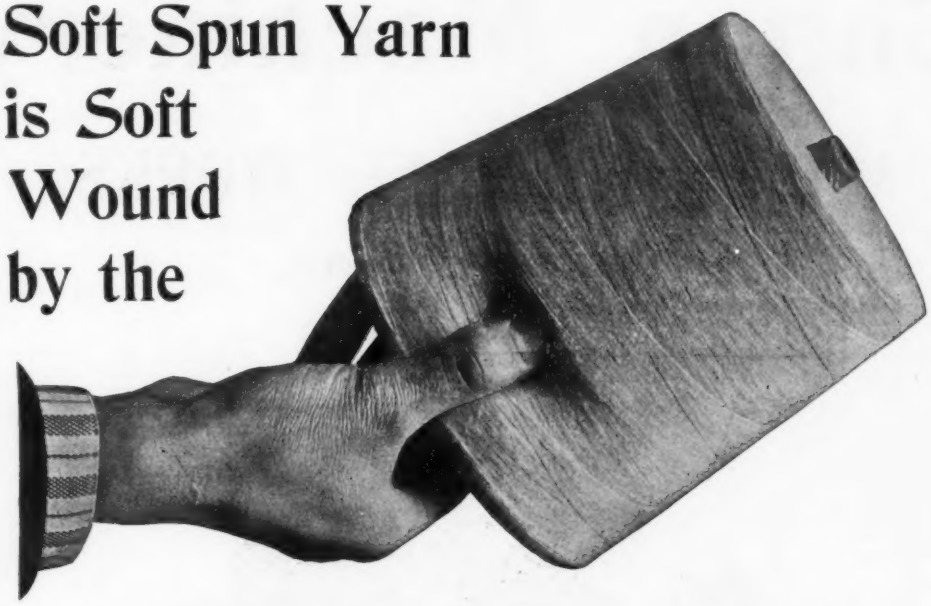
As well as

A Complete Line of Full Antomatic and 7-8 Automatic Seamless Hosiery Machinery.

Full Particulars, Samples and Special Catalogues on Application.

2079 E. Cumberland Street, Philadelphia, Pa., U. S. A.

Soft Spun Yarn is Soft Wound by the



Universal System of Winding.

Retains the strength and improves the quality. There is absolutely no crushing, crinkling or stretching — the elasticity of the yarn is unimpaired. But little pressure is used in winding and this little automatically decreases as size of cone increases. Produces a soft cone which delivers perfectly — with uniform tension in unwinding. In the various types of drum or frictional winders the cone or tube holder is weighted so that it will rotate by contact with the drum and wind the yarn *against the resistance of the tension*. Over two pounds is added to this pressure during the process of winding a full sized cone. The inevitable result is a package having large and irregular spacings into which the succeeding coils of yarn are pressed by contact with friction roll or drum.

We build machines for winding all kinds of yarn, thread or twine. Write for catalog.

Universal Winding Co., Boston, Mass.

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TAUNTON, MASS.

Southern Office,
Charlotte,
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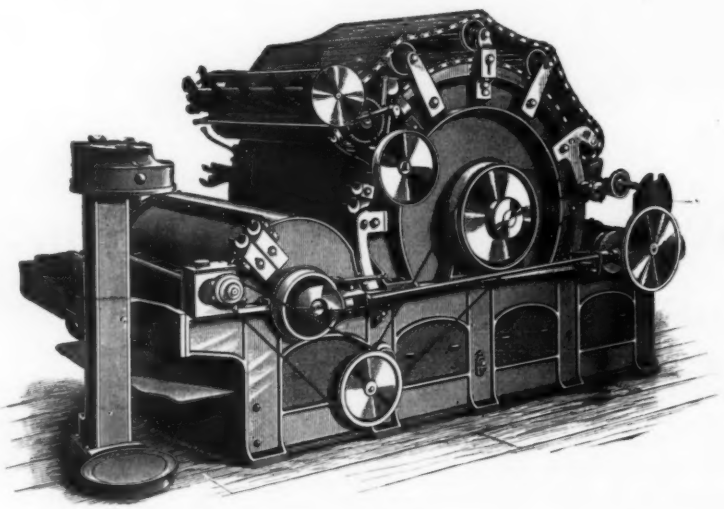

Cards,
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Heads, Drawing Frames
Spinning Frames, Mules and Looms

INCLUDING

Plain and Fancy Silk Looms

EVAN ARTHUR LEIGH

232 Summer Street (opposite the South Station), Boston, Mass.

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IN THE UNITED STATES AND CANADA FOR

Platt Bros. & Co., Ltd.

BY FAR THE LARGEST MAKERS IN THE WORLD OF

Cotton, Woolen and Worsted Machinery

Platt's Patent Opening and Picking Machinery.
Platt's Cotton Comber will comb from 7-8" stock to Sea Islands.
Platt's Special Machinery for Making Cotton Waste into Yarns.
Platt's Special Machinery for Making French Worsted Yarns.
Platt's Woolen and Worsted Carding Engines, Special Designs.
Platt's Cotton, Cotton Waste, Woolen and Worsted Mules.

MATHER & PLATT, LTD.

Dyeing and Finishing Machinery.
Archbutt-Deeley System for purifying and softening water.

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Flax, Hemp and Jute Machinery.

GEORGE HODGSON, LTD.

Looms for Worsteds, etc.

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Patent Feeding Machines for wool, cotton, flax, fur and fibrous material.

JOSEPH SYKES BROS.,
Card Clothing for Cotton.

JAMES CRITCHLEY & SON'S,
Card Clothing for Woolen and Worsted.

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Grinding Machinery and Emery Filleting. The Best French and English Combing and Rubbing Aprons. Harding's Pins and Circles. Varey's Fallers, etc.

Jacob K. Altemus is

Able to supply the best

Cop Winding Machinery

Or Hosiery Winders and more in particular

Bobbin Winders,

Keep in mind that I

Always produce machines that are right

Letting nothing go out

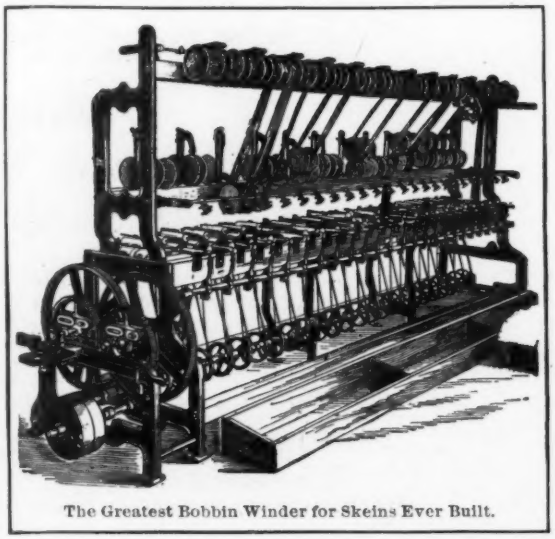
That is not satisfactory before delivery.

Every

Manufacturer should investigate warping and beaming machinery, warp splitting as well,

Upright Spoolers, Quillers, Warpers, Twisters, etc.

Send for full information and prices.



The Greatest Bobbin Winder for Skeins Ever Built.

Textile Machinery

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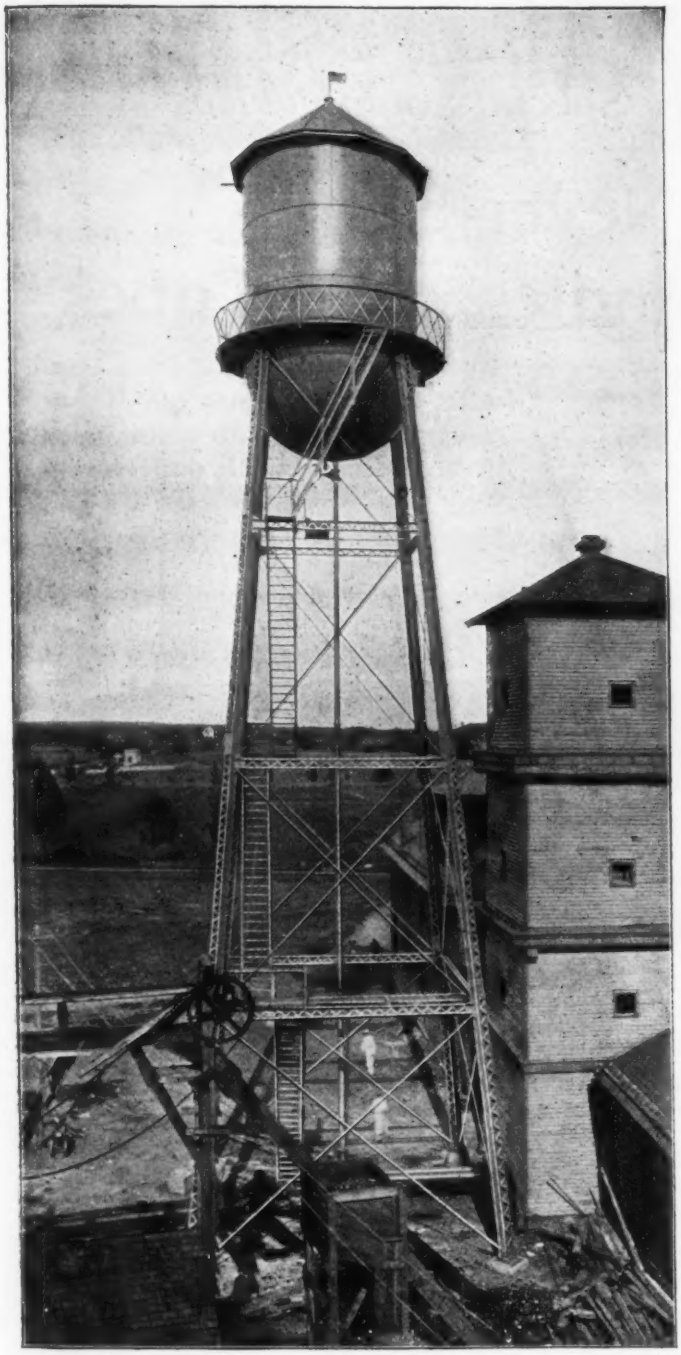

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Water Towers

Are furnished by

Tippett & Wood

They provide a storage for water under pressure, and are valuable for fire protection and personal uses

The T. & W. Towers do not fall or leak.

All Sizes Built

Plans and prices given on application.

Address

Tippett & Wood

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Shuttles for all Textile purposes and Sundry Special Loom devices

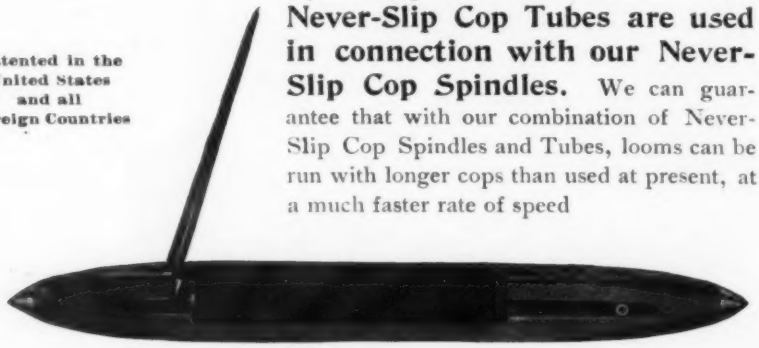
Never=Slip Cop Spindles and Tubes

Never-Slip Cop Tube

Patent applied for

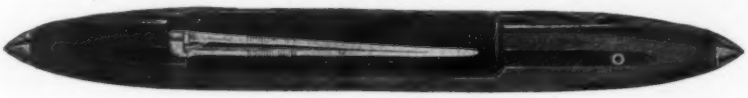
Patented in the United States and all Foreign Countries

Filling-Waste is reduced to nothing and long Cops will only be a success if our Never-Slip Cop Tubes are used in connection with our Never-Slip Cop Spindles. We can guarantee that with our combination of Never-Slip Cop Spindles and Tubes, looms can be run with longer cops than used at present, at a much faster rate of speed



Shuttle with Spindle Raised

U. S. Patents: 778851, Jan. 3, 1905; 790611, May 23, 1905; other patents pending



Shuttle with Spindle Lowered.

U. S. Patents: 778851, Jan. 3, 1905; 79611, May 23, 1905; other patents pending

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American Textile Specialty Machinery Co.

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NEAR MOTT AVENUE SUBWAY STATION

Electric and Automatic

Warp Stop Motion for Silk, Wool and Cotton

Simplicity! *Perfection!*

HARWOOD'S MACHINERY

Increases Production, Improves Quality, Decreases Labor Cost.

THE BRAMWELL SELF-WEIGHING FEEDER,

For Woolen, Worsted, Hosiery and Shoddy Cards and Garnett Machines.

We began introducing this feeder more than twenty years ago and its use is now practically universal. Many other types and makes have been tried and discarded, but the Bramwell, in its improved and up to date form, is now recognized everywhere as the most perfect feeder and only complete feeding machine in the world.

Our long experience has proved conclusively that where evenness is required—determined by weighing—our weighing feature is absolutely indispensable. Several attempts have been made to introduce feeding machines ignoring this principle, but none have succeeded.

We have made a careful study of all phases of the feeding problem and by adaptations and modifications of the Bramwell Feeder to meet the particular conditions, are prepared to feed evenly all kinds of stock from rabbit's fur to jute tow, including shoddy, cotton, fine wool, mixtures, fine and coarse worsted, flax tow, long worsted and all other kinds of stock.

THE APPERLY FEEDER,

For Second Breaker and Finisher Cards.

This machine was originally brought to this country and introduced against great opposition by the founder of this concern, the late Geo. S. Harwood. Today there are about 15,000 machines of our construction running in this country and Canada. We have greatly improved the machine. It is today an efficient, positive and up-to-date feed, and we can offer manufacturers the choice between the KEMP POSITIVE GEARED TRAVELER and the STANDARD TRAVELER with all other recent improvements.

THE BRAMWELL PICKER FEED,

For Burr Pickers, Mixing Pickers, Fearnaughts and Lumpers.

We consider our improvements in picker rooms of the utmost importance for up-to-date manufacturers. In fact, wide awake manufacturers are more and more realizing the wisdom of bringing their stock to the card room in a better state of preparation. Hand feeding is becoming a thing of the past in the picker room as in the card room. The latest Bramwell Picker Feed is built to handle all kinds of stock in any quantity with evenness and without injury to the staple.

THE SPENCER AUTOMATIC STOCK OILING MACHINE.

This is a modern device for oiling the stock automatically on its way to the picker from the BRAMWELL PICKER FEED, superseding the wasteful, dirty method heretofore in use. Because of the accuracy of this method and the fac. that the oil goes on the stock only (instead of the floor and walls) there is a large saving of oil, and the stock is at the same time more evenly oiled and much better prepared for the carding process.

THE MODERN BRAMWELL FEED FOR WOOL WASHERS AND WOOL DRYERS.

The scouring and drying of stock is today recognized as a very important part of the manufacture of textiles, especially in worsted mills. Our feeds are recognized as the standard for properly feeding stock in the grease or wet stock with absolutely no injury to the staple, with evenness and in sufficient quantity and in the best possible condition for economical scouring. There have been other feeds offered for this class of work, but after clogging up and giving all kinds of trouble most of them are today in the scrap heap, having been replaced with our feeders.

REPAIRS AND IMPROVEMENTS FOR OLD FEEDERS.

We have not been standing still all these years and the feeders we are building today are modern and up-to-date but these improvements and attachments can be placed on older feeders of our construction, greatly to their benefit. We do not hesitate to claim that **no outlay will show a greater return** to a manufacturer than money spent in bringing your Bramwell and Apperly Feeds thoroughly up-to-date.

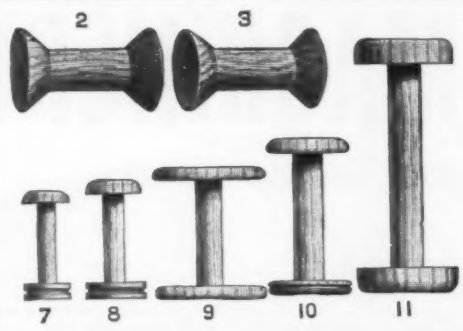
APRONS OF ALL KINDS FOR BRAMWELL FEEDERS.

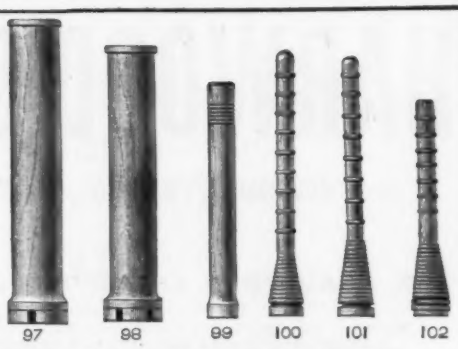
We build about thirty different styles of spike aprons adapted to the various kinds of stock BRAMWELL FEEDERS are called upon to handle. Our policy is and will be to put into our aprons the best materials and workmanship money can buy. We know we could make cheaper aprons by using cheaper materials and less expensive labor and it would take manufacturers some years to find us out. The apron would LOOK nearly as well but would WEAR only two or three years, instead of from five to ten or twelve. Do not trust the man who says he can sell you aprons cheaper than we can. He can do it (and so could we) but you pay the bill in the end. The best is none too good and is the cheapest in the long run.

Call on us for particulars and information about all matters relating to Feeding Machinery.

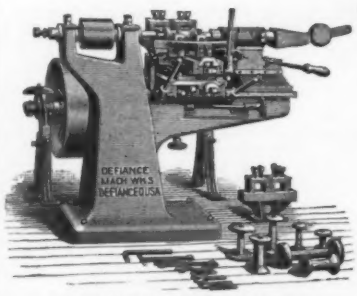
GEO. S. HARWOOD & SON,

53 STATE ST., BOSTON, MASS.





SPOOL AND BOBBIN MACHINERY



AUTOMATIC SPOOL TURNING LATHE

Complete Equipment
OF THE
MOST MODERN TOOLS
25% SAVED
Over the Old Methods
Send for Catalogue and Particulars to
THE
Defiance Machine Works,
DEFIANCE, OHIO

AUTOMATIC BOBBIN LATHE

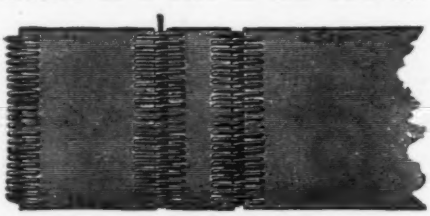
Don't You Want

a better method of lacing your belts? A cheaper, more convenient method, one that permits a belt to be taken apart and shortened or lengthened in a few seconds to meet any emergency? Get

A Jackson Belt Lacer

Its work has all these advantages. It laces a 5″ belt in less than three minutes at a cost of one cent for the lacing.

This is how it looks



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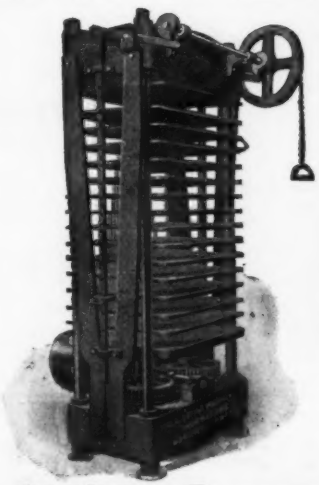
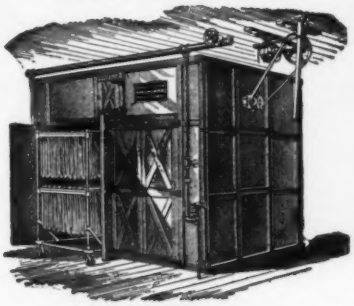
Birdsboro, Pa.

"HURRICANE" DRYERS AND FANS



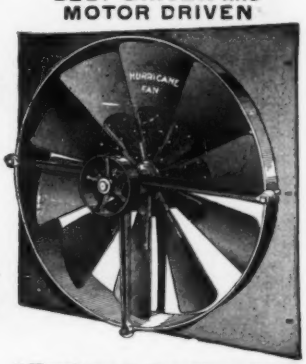
Power Screw, Hydraulic and Lever **Presses**

For Wool, Cotton Stock, Yarn, Stockings, Underwear, Etc.



Truck Yarn Dryer.

BELT DRIVEN AND MOTOR DRIVEN



"Hurricane" Fan, Style No. 2. Write for Catalogues.

COMPLETE EQUIPMENTS FOR DYEING, SCOURING, BLEACHING, CARBONIZING, OXIDIZING, CHROMING, Etc.

PHILADELPHIA DRYING MACHINERY CO.

6721 Germantown Ave., Philadelphia, Pa.

Fairbairn Lawson Combe Barbour, Ltd.

LAWSON BRANCH,

Hope Foundry. LEEDS. England.

MAKERS OF MACHINERY FOR

PREPARING AND SPINNING FLAX, HEMP, TOW AND JUTE

AND OF

Special Machinery for the Manufacture of Twines,

ALSO OF

GOOD'S COMBINED HACKLING AND SPREADING MACHINE,

LONG REACH SCREW-GILL DRAWING FRAMES,

CHAIN-GILL DRAWING FRAMES with Apron Head,

PATENT HIGH-SPEED HORIZONTAL AND AUTOMATIC SPINNING FRAMES FOR MANILLA,

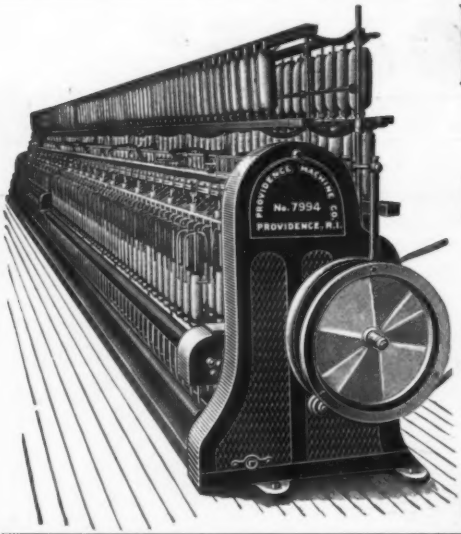
AND OTHER

Special Machinery for the manufacture of Rope Yarns and Binder Twine.

IMPROVED LAYING MACHINES. HASKELL-DAWES TUBING TWISTERS

BROWNELL'S PATENT TWISTING AND LAYING MACHINES FOR TWINE.

Complete Plans and Estimates for Flax, Tow, Hemp and Jute Mills, Trawl Twine Factories and Steam Ropeworks.



Providence Machine Co.

Manufacturers of

Improved Cotton Roving Frames

Improved Worsted Roving Frames

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FOR

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We offer an attachment for use with our Gear Cutting Machine, to cut key seats for the Woodruff System of Keying. Write for description, circulars and price.

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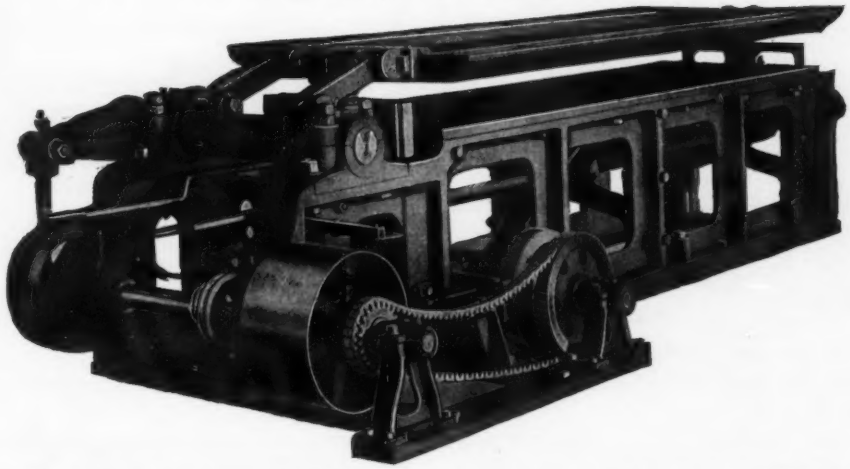

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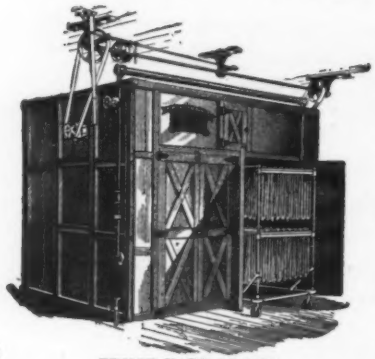

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Dryers for Wool and Cotton Stock, Yarn, Stockings and Underwear.

Carbonizers, Yarn and Wool Scouring Machines.

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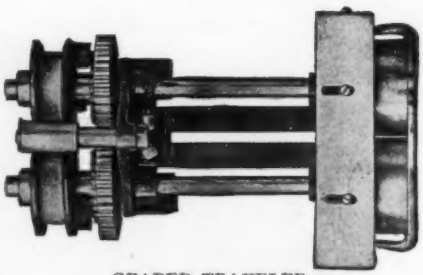

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We also manufacture Kershaw's Geared Traveler and Improved Web Feed.

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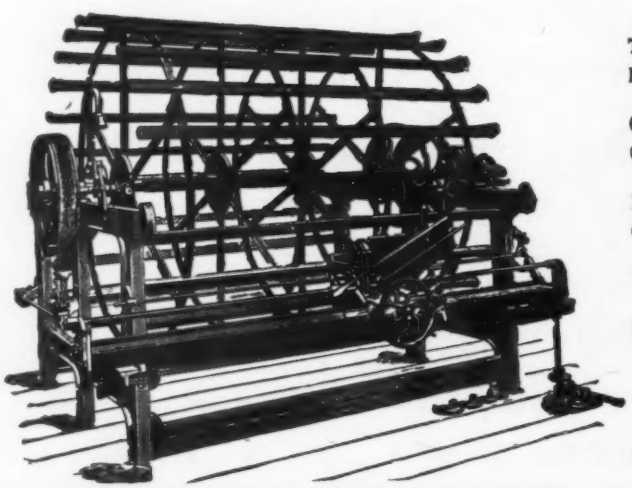

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Makers of all descriptions of Tentering and Drying Machines.

Moore & Whiteley's Patent Wool and Cotton Dryer.

Crabbing or Winding-on Frames.

Cross Raising Machines, Wool Scouring Machines,

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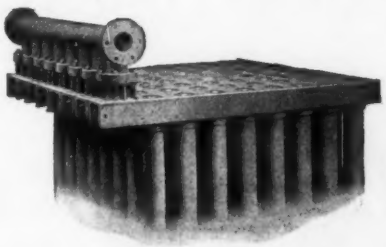

About Top Headers

Crudely designed economizers are from time to time projected by builders lacking experience and our patents.

Take so simple a thing as the top header. Economizers are built up of "sections" standing side by side. A section comprises a row of tubes pressed into a topand a bottom header. In the Green Fuel Economizer cold feed water in conducted along the ends of the assembled sections by a cast iron pipe having branches to each of the bottom headers. It then rises slowly through the vertical tubes, receiving heat from the hot gases, after which it flows to the opposite end of the upper header, where it escapes through a vertical connection into another cast iron pipe running over the economizer and having a branch at each section.

In some makes of economizers this Branch Pipe has been "saved." The top headers are provided with openings and faced surfaces on the sides at one end, a gasket is placed between, and each header, as erected, is drawn up tightly against the preceding by means of bolts.

Now when one of those packings leak or blows out or header cracks after the economizer is in service, imagine the time the purchaser has in getting the section out. To repair one header or packing you must tear the whole economizer to pieces.

Green Fuel Economizer Sections are not crowded together and it is easy to get one out and to make a tight joint with the "branch" pipe in putting it back. This might be worth half the price of the Economizer to you.

Write for the BOOK "T W" on Power Plant Economy and also for Fan, Blower and Exhauster Catalogs.

The Green Fuel Economizer Co.

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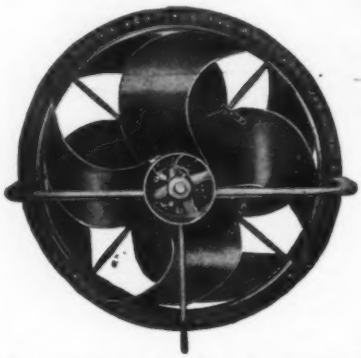
GEO. H. GIBSON CO. PARK ROW NEW YORK

(Sole Builders in this Country.)

COMPOUND—THAT'S WHY

Barney Compound Ventilating Fans Ventilate, Purify, and Dry.



Notice the compound feature—it does the work. They force out all atmosperic impurities and draw in pure air. They often double capacity of drying rooms, expel loose steam from dye houses—preventing condensation, *cool spinning rooms*.

The Barney System is the most economical.

TELL US YOUR PROBLEM.
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Be sure that clean oil reaches the bearings

Our Dust Proof Oil Hole Covers

Are a certain means to this necessary end. They *keep out* dirt, grit, lint and dust. See that they are on all the machinery you buy or build.

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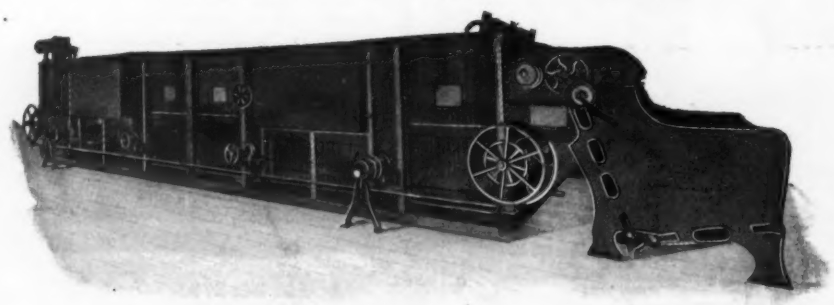

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Stock Dryers, Wool Washers,
Wool Dusters, Carbonizing Plants,
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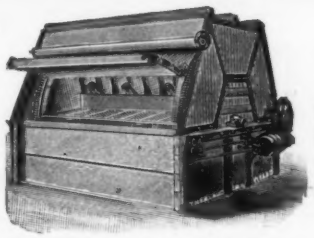

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2 MONTHS' TRIAL
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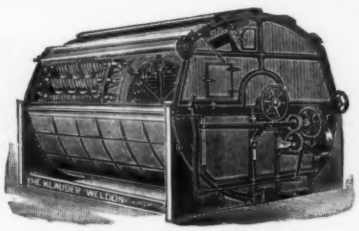
RISK



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THE KLAUDER-WELDON DYEING MACHINE COMPANY

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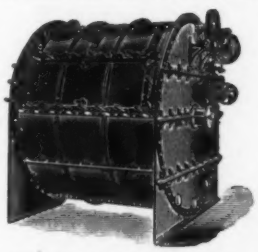
Machines for Dyeing, Bleaching and Scouring Woolen, Worsted, Cotton and Silk Skeins—Slubbing—Raw Cotton and Wool, Waste, Rags, Shoddy, Hosiery, Underwear, Hats, Caps, Knit Cloth, Tapes, etc.



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Special Machines for Sulphur Colors

WILL EARN THEIR COST IN
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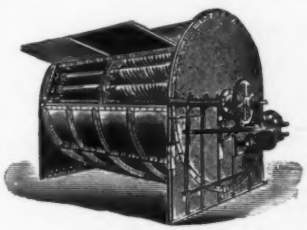

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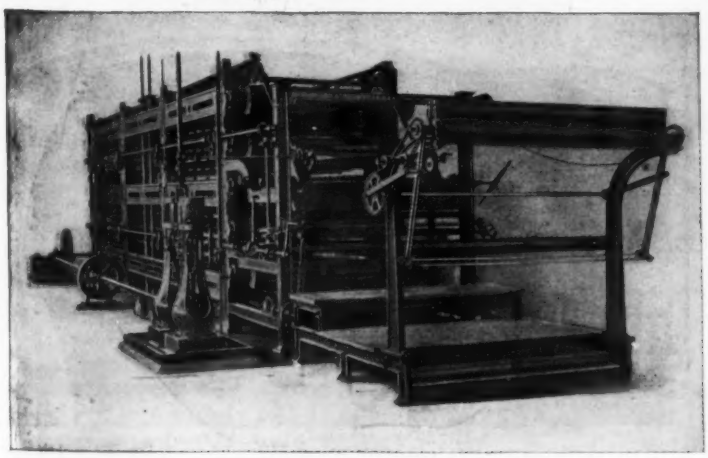
WITH LOW DOWN FEED. **PATENTED FEBRUARY 26, 1895.**



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Fulling Mills, Washers, Chinchilla and Whitney Machines, Whipping Machines, Cone Willows, Marsden & Blamire Lap Feed, Dyeing Machines for Piece Goods, Soaping Machines, Wringing Machines, Jigs (Double or Single), Dewing Machines, etc. Crabbing Machines for worsted. Made either single, double or triple.

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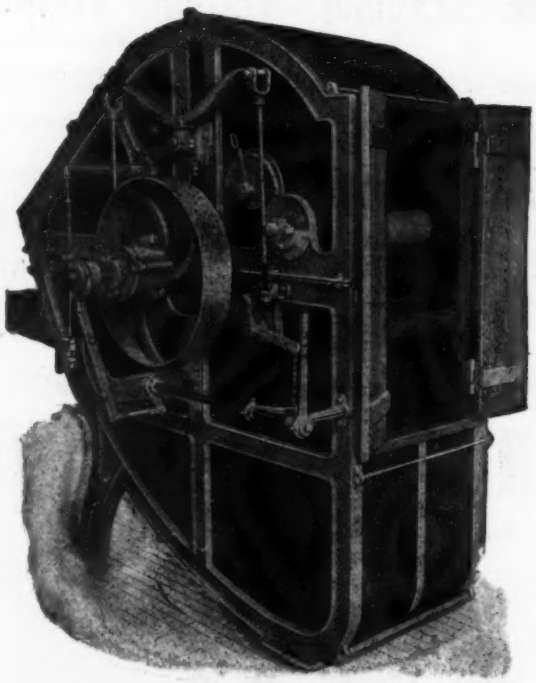

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Increase Efficiency and Reduce Cost of Operation.

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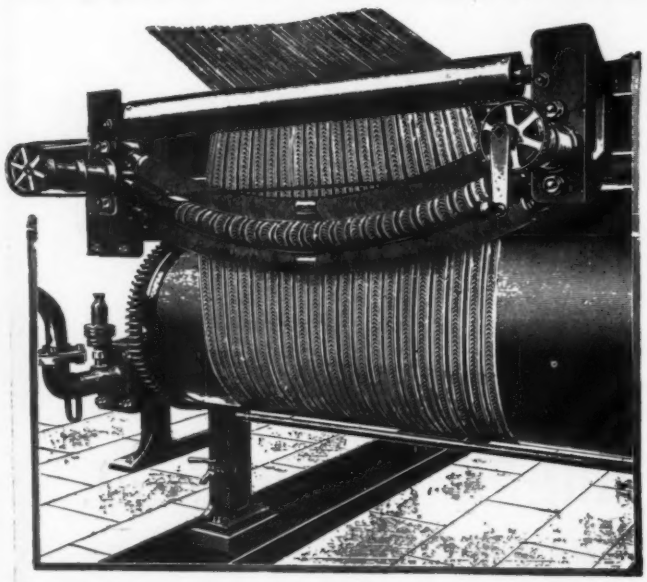
A PERFECT CLOTH EXPANDER



The recent invention of Wm. Mycock, an English cotton manufacturer. Hundreds sold in Great Britian and on the Continent. Large bleacheries in this country where it has been placed on trial are delighted with it. Gets the full width of goods, with perfectly even tension both ways. Can be attached to calenders or cans. Put it on trial.

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Economy Steel Tiering Machines

Also Saves
TIME,
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Damaged Stock

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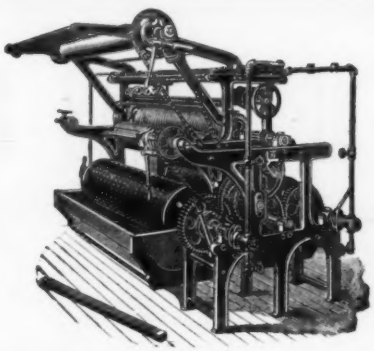

OUR CELEBRATED
Steam Finishing Machines
For Face Lustering
Send for Treatise on Steam Finishing
PARKS & WOOLSON MACHINE CO
Springfield Vermont

Patented in the United States and Foreign Countries.

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WROUGHT STEEL
PULLEY

Is a parting PULLEY and can be applied without stripping the shaft.
It is Light, STRONG, and lasts a lifetime.
It clamps to the shaft perfectly — keys and set-screws superfluous.
Interchangeable metal Bushings to fit shafts of different sizes.
Particularly adapted to TEXTILE manufacturing.

Sold by the Leading Supply Houses all over the WORLD.

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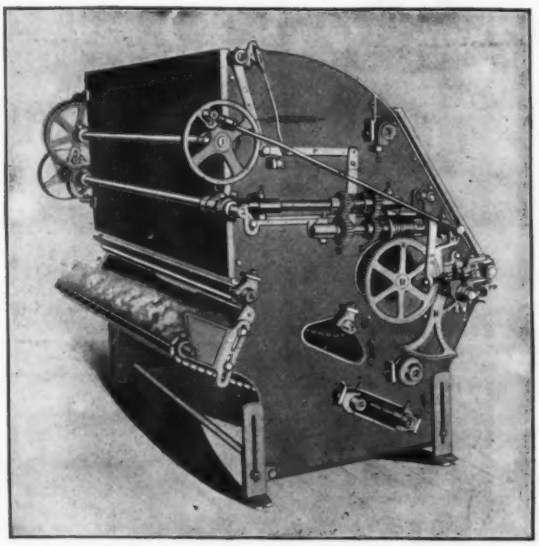

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Woonsocket Machine and Press Company

WOONSOCKET, R. I.

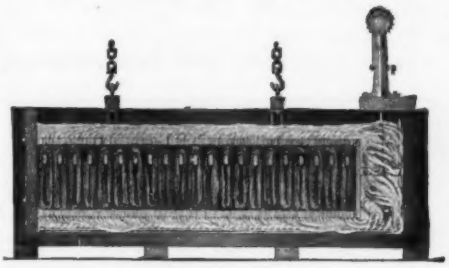
The Hussong Dyeing Machine

THE ONLY MACHINE THAT WILL DYE SULPHUR BLACK SUCCESSFULLY.

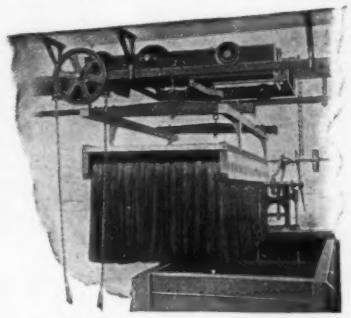
Patented Nov. 6, 1900. April 9, 1901. Nov. 29, 1904. June 5, 1906.

Dyes perfectly even.

By new and novel means the dye-liquor is moved through the yarn without friction. By a simple device the flow is reversed bringing the dye-liquor in contact with every part of the yarn. This method gives an absolutely uniform durable color and leaves the yarn in the best possible condition for spooling.



Longitudinal Sectional View, showing the circulation of dye-liquor through the yarn when in operation.



This illustration shows our Compressed-Air Hoisting Carriage, with 300-pound Yarn Machine suspended.

Saves the dyestuffs.

A powerful compressed-air hoisting machine moves the yarn from one dye-tub to another without removing the yarn from the yarn frame, saving the dye-liquor for successive batches of yarn. Any practical dyer can see what this means in economy of dyestuffs. Great saving in steam as well. A cover on the yarn frame (not shown in cut) tightly closes the dye-tub when yarn is lowered in the liquor.

Reduces labor cost 75 per cent.

The yarn is washed, scoured and dyed without removal from the frame. So little labor is required with this machine, that one man alone can dye 1500 lbs. of sulphur black perfectly even, in ten hours. Write for catalogue and list of users.

Built by the

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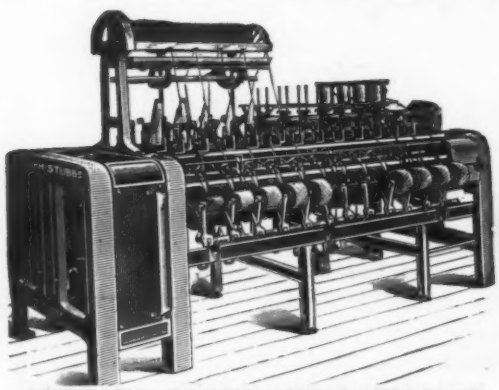
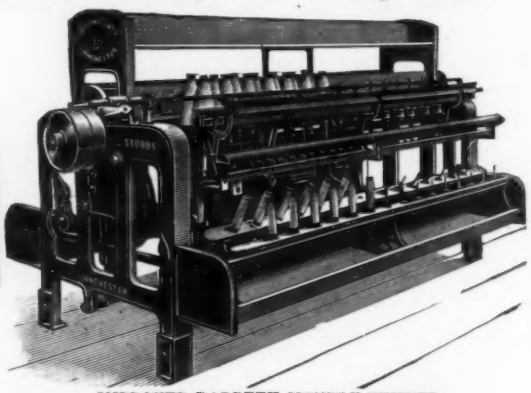
SPECIAL MACHINERY

For Winding, Gassing, Reeling, Preparing, Polishing and Bundling Yarns.



PATENT QUICK TRAVERSE COTTON GASSING FRAME.



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With Patent Tapering Motion, for Single Flanged Bobbins.

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And Has Been Adopted by the Representative Manufacturers of this Country.

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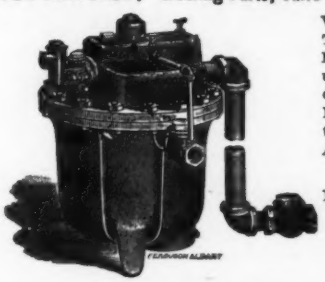
NEW FEATURES; Wearing Parts, Valve and Seat Renewable.



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Eureka Fire Hose

THE BEST FIRE HOSE MADE.

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Seamless Woven and Rubber lined EUREKA COTTON HOSE, has no equal. Send for circular and testimonials.

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Mill Sewing Machines

No. 9—Portable Foot-Power Rotary Sewing Machine

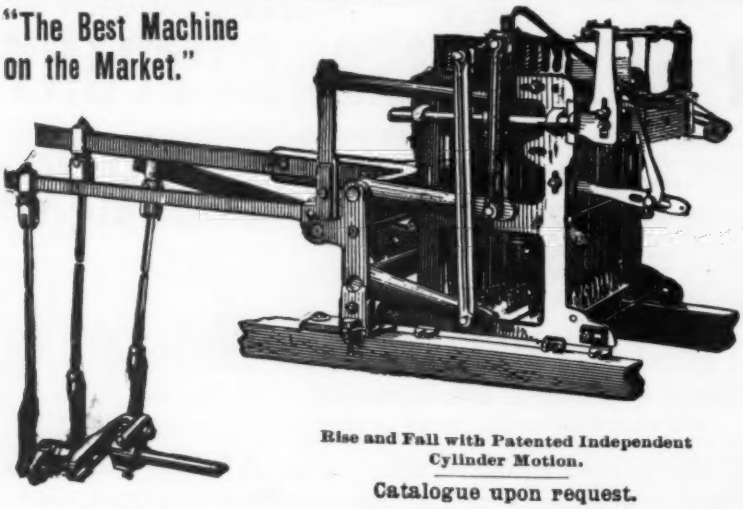
It is especially adapted for use in Cotton and Woolen Mills, Bleacheries, Print Works at the Printing Machines, in Dye Works, Cloth Rooms, at the Fulling Mill, Shears, Calendars, Gigs, Drying Machines, etc., or any of the different finishing processes in textile mills.

Manufactured by the

DINSMORE MANUFACTURING CO.,

Salem, Mass., U. S. A.

"The Best Machine on the Market."



Rise and Fall with Patented Independent Cylinder Motion.

Catalogue upon request.

USE THE

HALTON JACQUARD

Original Fine Index Machines

Single Lift, Double Lift, Double Cylinder, Rise and Fall, Crossborder,

THOMAS HALTON'S SONS,

Allegheny Avenue and C Street,

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Representatives
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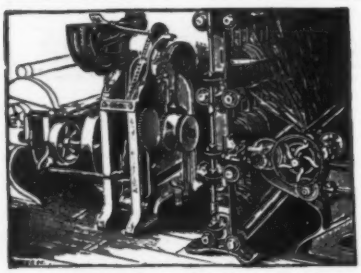

TORRANCE MFG. CO.,

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TORRANCE PATENT AUTOMATIC BALLING MACHINE

With all the latest improvements for Wool Cards. The latest and best and only Feed that will make yarn positively even.

ALSO

CHOQUETTE WASTE SAVER. Saves card fly.

Write for particulars.

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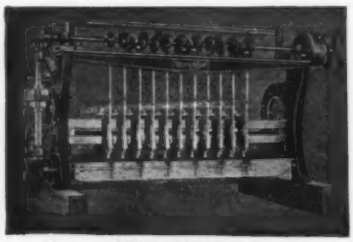
HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO. HARTFORD, CONN.

NEW ENGLAND DEPARTMENT
101 MILK STREET,
BOSTON, MASS.

C. E. ROBERTS, Manager. W. H. ALLEN, Ass't Manager.

STEAM USERS of this country have upwards of 90,000 Steam Boilers under the inspection and insurance supervision of this company.



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MANUFACTURER AND BUILDER OF

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FOR ALL PURPOSES WHERE A NUMBER OF ROWS OF SEAMS ARE REQUIRED

BUILT WITH ANY REQUIRED NUMBER OF NEEDLES.

DESIGNER OF SPECIAL MACHINERY | WALPOLE, MASS. U. S. A. | PAPER SLITTING MACHINES

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INDIAN ORCHARD, MASS.

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Especially adapted for Cotton Mills. 25 to 33 per cent more Production Guaranteed. Weight Reduced 33 to 50 per cent. No Leather Covering Bill.

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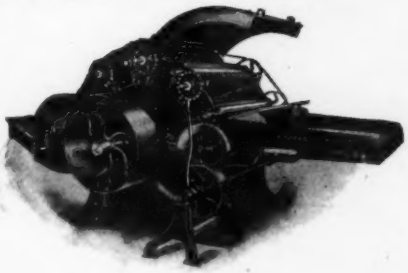

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Wool Burring and Picking Machinery.

Cloth Finishing Machinery.

CIRCLES, HACKELS, GILLS, FALLERS and PORCUPINES.
CIRCLE KNIVES TO ANY PATTERN.

R. H. HOOD,

Manufacturer of

MACHINE WOOL COMBS

Dealer in

The Best English and American

CAST-STEEL PINS.

1842-44-46 GERMANTOWN AVENUE,

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T. C. Entwistle Company

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Southern Agent:
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"Coronation" Mill Sewing Machines.

Sews any fabric, wet or dry, thin or thick, fine stitch or coarse stitch.

Send for Catalogue.

Sent on Trial.

BLEACHING, DYEING AND FINISHING MACHINERY.

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Leather Fibre S Manilla

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Paper Specialties,

Fibres, Colored Textile Wrappers,

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EASTON & BURNHAM MACHINE CO.
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CORK INSERTS

The "COMPO" Clutch and Pulley.

Patentcd **(WITH CORK INSERTS)** Patented

ONE THOUSAND FIVE HUNDRED WOOLEN LOOMS NOW being equipped with CORK INSERT CLUTCHES for the WOOD WORSTED CO., LAWRENCE, MASS.

We aim to have "Compo" Clutches and Pulleys adopted generally. We believe this will be the case when the rare qualities possessed by Cork are better known.

Leather Suffers by Comparison

TESTS OF LOOM CLUTCHES made at the Worcester Polytechnic Institute showed that at same pressure of clutch the "Compo" clutch (cork inserts) transmitted twice the pound feet of Torque transmitted by the standard leather-faced clutch of same size and area of clutch surface, and this with great smoothness of engagement and without gripping or seizing; and that **at one-half the pressure** the "Compo" clutch transmitted equal Torque.

We Charge but a Small Royalty

We license manufacturers to make "Compo" or composite Clutches, Pulleys or Brakes, by equipping THEIR product with Cork Inserts, and WANT YOU to try ONE equipped under our direction.

THE REASON

WHY THOUSANDS OF CORKS are in use in loom clutches, and why *Cork insert* clutches are rapidly displacing the leather faced clutches,

WHY THE AMERICAN WOOLEN COMPANY has adopted *Cork Insert* clutches,

WHY THE CROMPTON & KNOWLES LOOM WORKS of Worcester, Mass. (licensee), is shipping more than 100 looms so equipped, per month,

WHY THE AMOSKEAG MFG. CO. (licensee) is rapidly equipping its Worrall clutches and loom clutches with *Cork Inserts*,

WHY THE CROMPTON-THAYER LOOM COMPANY of Worcester, Mass. (licensee), has adopted the "*Compo*" *Cork Insert* clutch for practically its entire output,

WHY THE WOOD WORSTED COMPANY has ordered 1000 looms and will soon order 500 more looms fitted with *Cork Insert* clutches for the new mill now being erected at Lawrence, Mass.,

WHY Cork Inserts should be used in ALL TYPES of power transmitting devices,

WHY MORE THAN ONE MILLION CORKS have been used in electric street railway brake shoes in Boston and vicinity. Licensees, J. B. & J. M. Cornell Company, New York, N. Y., and the Gibby Foundry, Company, East Boston, Mass.,

WHY THE LIDGERWOOD MANUFACTURING COMPANY (licensee) has sold over *two hundred and fifty thousand dollars* worth of hoisting machinery fitted with *Cork Insert* frictions,

WHY THE AUTOCAR COMPANY of Ardmore, Pa. (licensee), inserted *Cork Inserts* in its type of disk clutch in more than two thousand cars during 1904 and 1905,

WHY THE AUTOCAR COMPANY will use *Cork Inserts* in about fifteen hundred automible clutches during 1906,

WHY licenses already granted to automobile manufacturers insure the use of *Cork Insert* Clutches or Brakes or both on more than twenty well known lines of cars in 1907,

WHY THE REPORTS OF TESTS made at the Worcester Polytechnic Institute, Purdue University, and Lawrence Scientific School of Harvard University, showing the remarkable results obtained by the use of CORK INSERTS, *should interest you*,

IS BECAUSE

CORK INSERTS increase the power transmitted by leather faced clutches 100 per cent.

CORK INSERTS increase the power transmitting capacity of iron pulleys 50 per cent.

CORK INSERTS increase the coefficient of friction of metal surface 100 per cent.

CORK INSERT clutches seldom need repairs or adjustment.

And Principally and Particularly Because

THE PECULIAR AND GREAT FRICTIONAL QUALITY OF CORK is neither diminished nor affected by wear, dust, moisture, atmospheric conditions, water, oil, or other lubricants.

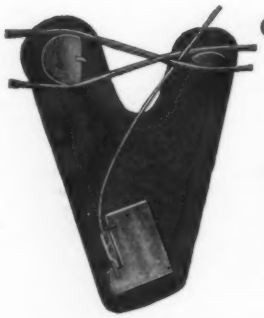
For particulars apply to

National Brake and Clutch Company

16 State Street, - - - - - Boston, Mass.

WM. W. WHITCOMB, Pres't. LAWRENCE WHITCOMB, Treas.

Absolute Efficiency from Bed-Rock Simplicity



Our **WARP-STOP** controls
TWO threads by ONE spring WIRE, held in a COMB,
engaging the warp
in such a way that
the TENSION is
UNDER CONTROL,
and
ABRASION of the
yarn is AVOIDED.

The COMBS are RAPIDLY INSERTED, BEFORE or AFTER the warp is in the loom, and are carried in a bar suspended from **the LEASE-RODS** which **ARE NOT FIXED** to the loom side, but **FREE to take their proper positions,** and **ALLOW the NATURAL MOVEMENT of the WARP,** so that **the COVER of the cloth is UNAFFECTED.**

When a thread breaks the WIRE SPRINGS OUT from the comb, thus giving
a CLEAR SIGNAL of the place
of the BROKEN END,
and, by striking
a CONTACT SLIP upon which
LINT CANNOT COLLECT,
closes the circuit through
a PERFECT KNOCK-OFF, EASILY and RAPIDLY FIXED, and **actuated by a SPARKLESS current.**

American Textile Appliances Co.

WILLIAM FIRTH, Treasurer.

79 MILK ST., BOSTON, MASS.

DURING THE APRIL MEETING OF THE

New England Cotton Manufacturers Association

We published a list of orders for the SIX MONTHS preceding covering **72** different mills. Since that report in the FOUR MONTHS succeeding we have received orders for our **System of Air Moistening** from **65** mills of which **44** were REPEAT ORDERS as given below:

AMOSKEAG MANFG. COMPANY, Manchester, N. H.
(Repeat order—Carding, Spinning and Weaving.)
LEDBETTER MANFG. CO., Rockingham, N. C.
(Repeat order—Carding and Spinning.)
SAXON MILLS, Spartanburg, S. C.
(Repeat order—Spinning and Weaving.)
EDENTON COTTON MILLS, Edenton, N. C.
(Carding and Spinning.)
PORTLAND CORDAGE CO., Portland, Ore.
(Repeat order.)
PARKHILL MANFG. CO., Fitchburg, Mass.
(Repeat order—Weaving.)
GAFFNEY MANFG. CO., Gaffney, S. C.
(Repeat order—Carding, Spinning and Weaving.)
STEERE WORSTED MILL, Providence, R. I.
(Repeat order.)
AIKEN MANFG. CO., Bath, S. C.
(Repeat order—Carding, Spinning and Weaving.)
THE PERRY KNITTING CO., Perry, N. Y.
(Repeat order—Carding, Spinning and Knitting.)
WHITIN BROS., Linwood, Mass.
(Repeat order—Carding, Spinning and Weaving.)
ELI LILLY & CO., Indianapolis, Ind.
WAUREGAN COMPANY, Wauregan, Conn.
(Repeat order—Spinning and Weaving.)
ALDORA MILLS, Barnesville, Ga.
(Carding and Spinning.)
LIMESTONE MILLS, Gaffney, S. C.
(Repeat order—Carding, Spinning and Weaving.)
SPARTAN MILLS, Spartanburg, S. C.
(Repeat order—Spinning and Weaving.)
LANGLEY MANFG. CO., Langley, S. C.
(Repeat order—Carding, Spinning and Weaving.)
MUSCOGEE MANFG. CO., Columbus, Ga.
(Carding and Spinning.)
GRANITEVILLE MANFG. CO., Graniteville, S. C.
(Repeat order—Carding, Spinning and Weaving.)
GEORGIA CORDAGE MILLS, Atlanta, Ga.
(Repeat order—Carding and Spinning.)
MARLBORO COTTON MILLS, McColl, S. C.
(Repeat order—Spinning and Winding.)
STANDARD SILK CO., Chadwick's, N. Y.
B. B. & R. KNIGHT CO. (Valley Queen Mill), River Point, R. I.
(Repeat order—Carding, Spinning and Weaving.)
PALMETTO COTTON MILLS, Columbia, S. C.
(Repeat order—Weaving.)
HAMILTON MANFG. CO., Lowell, Mass.
(Repeat order—Combing and Weaving.)
NEWTON MILLS, Newton Upper Falls, Mass.
(Repeat order—Preparing, Finishing and Conditioning.)
LAURENS COTTON MILLS, Laurens, S. C.
(Repeat order—Carding, Spinning and Weaving.)
TABER MILL, New Bedford, Mass.
(Weaving.)
DAVOL MILLS, Fall River, Mass.
(Ring Spinning.)
MITTINEAGUE PAPER CO., Mittineague, Mass.
(Paper Manfg.)
VICTOR MANFG. CO., Greers, S. C.
(Repeat order—Carding, Spinning, Weaving and Warping.)
ABBEVILLE COTTON MILLS, Abbeville, S. C.
(Repeat order—Spinning and Weaving.)
INTERNATIONAL FLAX TWINE CO., St. Paul, Minn.
(Twine Manfg.)
A. C. LAWRENCE LEATHER CO., Peabody, Mass.
(Leather Manfg.)
BIGELOW CARPET CO., Lowell, Mass.
(Carding and Spinning.)
WM. H. GRUNDY & CO., Bristol, Pa.
(Repeat order.)
PACOLET MANFG. CO., Pacolet, S. C.
(Repeat order—Carding, Spinning and Weaving.)
COX MANFG. CO., Anderson, S. C.
(Carding and Spinning.)
ELIZABETH MILLS, Hills Grove, R. I.
(Repeat order—Carding and Spinning.)
BEACON MANFG. CO., New Bedford, Mass.
(Repeat order—Carding, Spinning and Weaving.)
STEHLI & CO., Lancaster, Pa.
(Warping and Weaving.)
COLUMBIAN MANFG. CO., Greenville, N. H.
(Repeat order—Spinning and Weaving.)
INTERLAKEN MILLS (Harris Mill), Harris, R. I.
(Spinning.)
MANVILLE COMPANY, Manville, R. I.
(Repeat order—Carding and Spinning.)
U. S. COTTON CO., Central Falls, R. I.
(Repeat order—Carding, Spinning and Weaving.)
CHENEY BROS., South Manchester, Conn.
(Repeat order—Warping and Weaving.)
AMERICAN SPINNING COMPANY, Greenville, S. C.
(Repeat order—Carding, Spinning and Weaving.)
QUEEN CITY COTTON MILLS, Burlington, Vt.
(Repeat order—Weaving.)
ARKWRIGHT MILLS, Fall River, Mass.
(Repeat order— Spinning and Weaving.)
FARWELL MILLS, Lisbon, Me.
(Repeat order—Spinning.)
UTICA STEAM COTTON CO., Utica, N. Y.
(Repeat order—Spinning, Warping, Spooling and Weaving.)
THE SOUTHWARK MILLS CO., Philadelphia, Pa.
(Repeat order—Drawing, Combing and Spinning.)
PACOLET MANFG CO., Spartanburg, S. C.
(Repeat order—Spooling, Warping and Weaving.)
TUPELO COTTON MILLS, Tupelo, Miss.
(Spinning and Weaving.)
LAWRENCE DUCK COMPANY, Lawrence, Mass.
(Repeat order—Spinning.)
THE WORCESTER BLEACH & DYE WORKS CO., Worcester, Mass.
PICKENS MILL, Pickens, S. C.
ADELAIDE MILLS, Anniston, Ala.
(Carding and Spinning.)
DWIGHT MANFG. CO., Chicopee, Mass.
(Repeat order—Weaving.)
NINETY-SIX COTTON MILLS, Ninety-six, S. C.
(Repeat order—Spinning and Weaving.)
CORNELL MILLS, Fall River, Mass.
(Carding, Spinning, Warping and Weaving.)
DAN RIVER COTTON MILLS, Danville, Va.
(Carding, Spinning and Weaving.)
BRISTOL MANFG. CO., New Bedford, Mass.
(Repeat order—Carding, Spinning and Weaving.)
COVENTRY COMPANY, Anthony, R. I.
(Carding and Spinning.)
SMITH & DOVE MANFG. CO., Andover, Mass.
(Repeat order.)

WM. FIRTH, President. **FRANK B. COMINS, Vice-Prest. and Treas.**

American Moistening Company

79 Milk Street **BOSTON, MASS.**

J. S. COTHRAN, Southern Representative, Empire Building, Atlanta, Ga.

Conclusive evidence of merit—

repeat orders from leading mills after a year's constant use.

VENTILATION & HUMIDIFICATION
BELL PURE AIR AND COOLING CO.
TRADE MARK

The reason why we are getting these repeat orders is not hard to find—'tis the continuously satisfactory results that are secured by using the

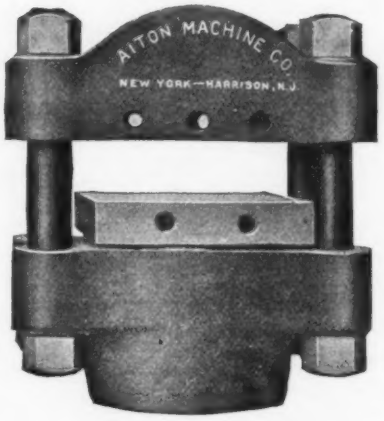
Bell Humidifying System

With its even and automatic regulation of humidity from card room to cloth room, the uniformity of conditions are maintained, that improve the quality and increase output.

Send for catalogue and prices.

Bell Pure Air & Cooling Co., 97 Cedar Street, **New York.**

Aiton Machine Co.



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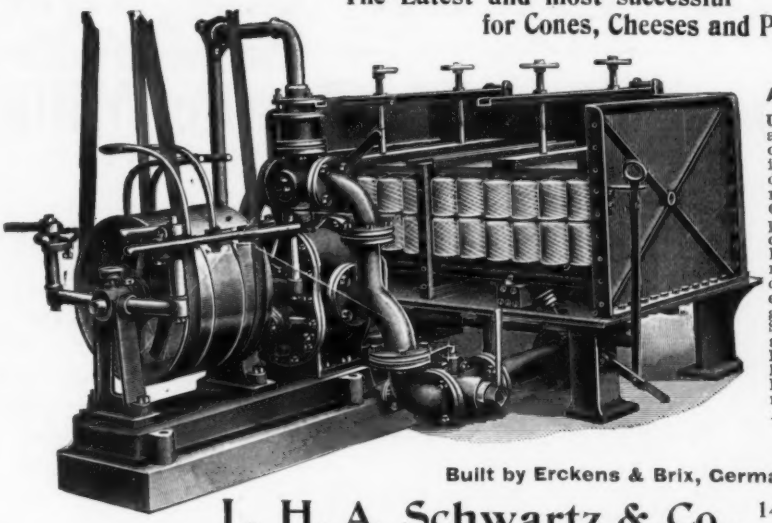
Our presses are made to meet all conditions

Cross Spool Dyeing and Bleaching Machine

The Latest and most successful for Cones, Cheeses and Parallel Tubes



ADVANTAGES:

Uniform bleaching and dying throughout. Colors requiring several baths dyed without removing bobbins. Good for fast sulphur black and all colors, little dye liquor needed; none lost. Bobbin deformation avoided, consequently good running off. Simple and accurate sampling, large production, little power. Very little attention needed, low price. *Many in operation.*

Built by Erckens & Brix, Germany

L. H. A. Schwartz & Co., 141 Milk St., Boston.

SOLE AGENTS FOR R. & O. Lindemann's Egyptian Cotton.

The Hogg Patented Card Feeders

for woolen and worsted cards are not an imitation but a radical departure in card feeding.

Our feeders have all the good features experience has found necessary in card feeding.

They combine simplicity, strength, durability and unformity in quantity and quality.

We guarantee the results and allow you to judge its value to you in your mill.

We positively guarantee that our Feeders will not sort or separate the long and short stock, which insures more perfect goods.

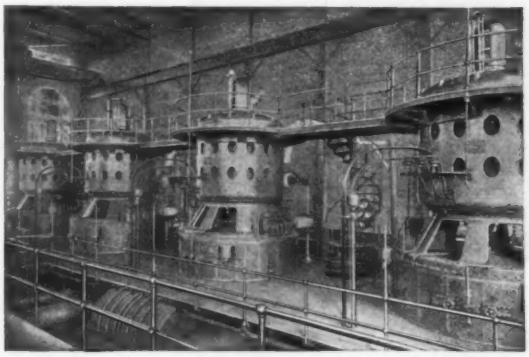
Positively no rolling or balling of the stock, which preserves the spinning quality of the fiber.

If you will write us, we will give you every opportunity to investigate for yourself.

The James Hogg Machine Company, Amsterdam, N. Y.

General Electric Company

Electric Power for Textile Mills



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The simple design, small floor space, perfect mechanical operation and rugged construction of the CURTIS STEAM TURBINE GENERATOR combine to make it the ideal power plant unit. It is always ready for work.

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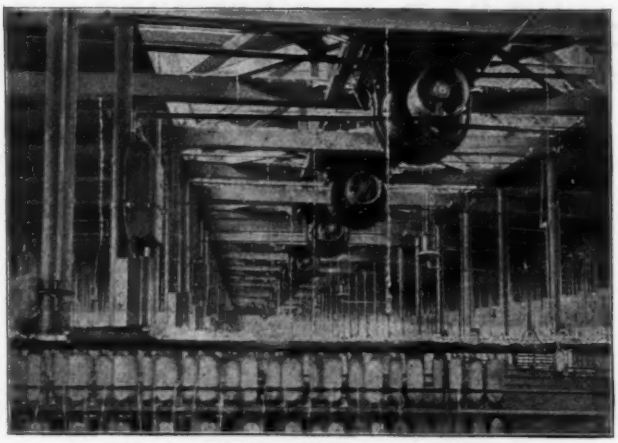
Over 100,000 horse power in General Electric Company's Motors is in use or under contract for textile mill motor drive. The many advantages of motor drive are found in saving in cost of plant, increased production, sub-division of power and increased power.



The General Electric Company employs specialists trained in textile work whose services are at the disposal of engineers or manufacturers for consultation or advice on textile mill power problems. 826

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Principal Office
Schenectady, N. Y.

New York Office
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Southern Office, Empire Building, Atlanta, Ga.

225 NASMITH COMBERS SOLD

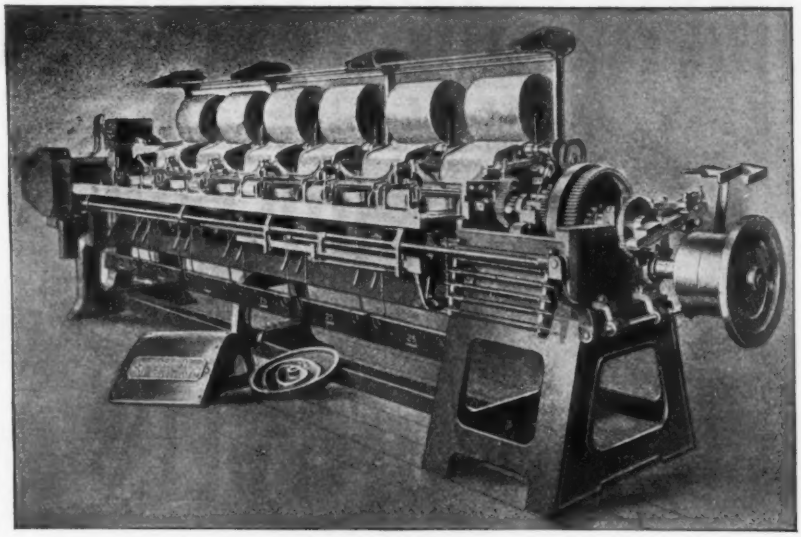
To the Finest Mills in the United States.

"One machine instead of two."

Production	Production
Set of 6 Combers, 10½ in. Lap.	**Set of 6 Combers, 12½ in. Lap.**
4500 to 5200 lbs. per week of 53 hours. The floor space required for set of 6 Nasmith Combers, 1 Ribbon and 1 Sliver Lap Machine is 662 square feet.	5200 to 6100 lbs. per week of 53 hours. The floor space required for set of 6 Nasmith Combers, 1 Ribbon and 1 Sliver Lap Machine is 677 square feet.

Combs any length of staple.

FINEST QUALITY



LESS WASTE

The Nasmith Patent Six Head Comber,

Stephen C. Lowe, 186 Devonshire St. BOSTON, MASS.

AGENT FOR

John Hetherington & Sons, Ltd., Manchester, England

Makers of Drawing, Slubbing, Intermediate and Roving Frames, Lap and Ribbon Lap Machines, New Metal Mule Carriage, absolutely fireproof, New Century Improved Carding Engine and **Nasmith's Patent Comber.**

Send for catalogues. Full line of parts constantly in stock.

30% to 75% GAIN.

On all widths of warps,
On all lengths of beams,
On all kinds of yarn,
On all sizes of mills,

Fewer warps to draw-in.
Less waste
Better weaving
Greater production.

Thousands running in hundreds of mills.

WARP COMPRESSORS.

PRESERVES THE ELASTICITY OF THE YARNS.

COMPRESSING SPOOLERS.

PATENTED CROSS WIND
for wool and worsted yarns.

PLAIN SPOOLERS.

PATENTED CROSS WIND
for worsted and cotton yarns.

CHAIN BEAMERS

COMBINED WITH

WARP COMPRESSORS.

Worcester Warp Compressing Machine Co.
Worcester, Mass.

BLEACHING
DYEING
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MACHINERY

ARLINGTON MACHINE WORKS
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CRABBING
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SEWING
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The Best That Money Can Buy

SPINNING RINGS.
TWISTER RINGS.
RING HOLDERS.
TRAVELER CUPS.
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TRAVELER CLEANERS.

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STEEL AND BRASS
MAILS.
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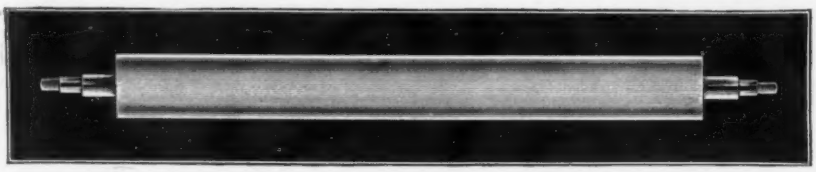
REEDS, HARNESSES, LINGOES, SHUTTLES AND QUILLS.

VULCANIZED RUBBER ROLLS FOR ALL MECHANICAL PURPOSES



Also Power Wringers of all Sizes and Descriptions

THE AMERICAN WRINGER COMPANY, 99 Chambers St., N. Y. City

SAVE
Their Cost
In Freight.

THE CHAFFEE PATENT CLOTH BOARD,
Made of paper and wood,
Needs no covers.
Will not split or warp;
Not liable to break.
BOX SHOOKS and CLOTH BOARDS.

MFG. BY
CHAFFEE BROTHERS COMPANY,
OXFORD, MASS.

Clean
LIGHT
Strong

Shaw's "Victor" Travelers
Manufactured by
VICTOR SHAW RING TRAVELER CO.
Incorporated 1899.
23 Sabin Street, PROVIDENCE, R. I.

G TRADE MARK **Weavers** G TRADE MARK

This Mark of Excellence

is stamped on our loom pickers, loom harnesses and lug straps. It guarantees the quality of the stock to be the best it is possible to procure and the workmanship to be as near perfect as the utmost care and the most skilled workman can produce.

Catalogue on application.

GARLAND MFG. CO., Saco, Maine, (Formerly Loom Picker Co.)

EXCELSIOR COTTON SOFTENER

Used with starch batches.

Excelsior Softener prevents sticking or gumming while the yarn is passing over the cylinders and the dropping of starch during the process of manufacture. Makes the yarn flexible and strong, avoiding many unnecessary delays in the weaving room. Insures clean, sweet smelling goods. *It is economical and reliable.* Send for prices, samples aud particulars.

Excelsior Wool Oil Compound Co., Cincinnati, O.

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Are invited to ask about our new brand of

Undoubtedly Standard **U. S. ROOFING** **Uuquestionable Superiority**

Made of fine wool felt, chemically treated, coated on both sides, waterproof and durable, **guaranteed.**

The LINCOLN WATERPROOF CLOTH CO.,

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Fluted Rolls, Pressers for Flyers

AND GENERAL MACHINERY

Specialties made of Renecking, Refluting, Filing and Honing of all kinds of Rolls. Flyers Repaired and Fitted with any desired style of Pressers, Spindles Straightened, Restepped and Retopped.

Box 528. FALL RIVER, MASS.

Established 1844.

BENJ. BUCKLEY'S SON,

(WM. J. BUCKLEY) *Gun Mill, Paterson, N. J.*

Manufacturer of all kinds of SPINDLES, FLYERS, RINGS, TUBES, CAPS, etc., for Cotton, Silk, Flax, Woolen and Worsted **Machinery.**

Roving Spindles and Flyers a Specialty. Light Forgings.

REPAIRING OF ALL KINDS.

ANYTHING

Entire Outfits for New Mills, or small and odd items that that you don't know just where to obtain, can be found at the

AMERICAN SUPPLY CO.,
PROVIDENCE, R. I.

in Mill Supplies.

ASHWORTH BROS.,

—MANUFACTURERS OF—

Card Clothing of Every Description

FALL RIVER, MASS.

Thread and Silk **SPOOLS** of any description

made from one piece, up to 6" long and 3' dia.

We are located in the best white birch region. Our work and prices seem to satisfy the most particular customers. We can give any finish desired. Estimates furnished on samples submitted.

E. L. TEBBETS & CO., Locke's Mills, Me.

WILLIAM SCHOFIELD CO.

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Makers of Rag, Wool, Hair and Finishing Pickers, Automatic Square and Cone Willows, "Schofield" Intermediate Feed for Cards, Rag and Extract Dusters, Waste Pullers, Worsted and Shoddy Reels, All Kinds of Spike and Slat Aprons.

Special Machinery Built **General Machinery Repairs**

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LEWIS' PATENT CARD CLAMPS.

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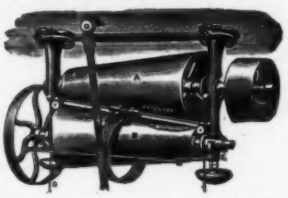
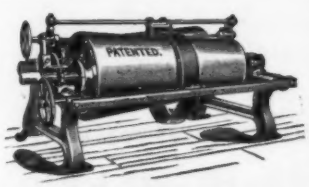
Eight Thousand Sets in Operation in This Country and Europe.

A partial list of manufacturers who have Evans' Friction Cone Pulleys in operation, transmitting from ONE TO FORTY HORSEPOWER:

National Biscuit Co., Richmond, Ind., 300 sets. Merrimack Mfg. Co., Lowell, Mass. 20 sets. Arnold Print Works, No. Adams, Mass. 11 sets. John & James Dobson, Philadelphia, Pa., 34 sets. Stinson Bros., Philadelphia, Pa., 40 sets. Frederick J. Falding, New York, N. Y., 20 sets.





Smith & Winchester Co., So. Windham, Conn. 250 sets. Furguson & McRae, Belfast, Ireland, 25 sets. Mercantile Laundry, So. Windham, Conn., 250 sets. Washburn & Moen, Worcester, Mass., large number, all sizes. Dennison Tag Co., Boston, Mass., large number, small sizes. Saco & Pettee Machine Co., Newton, Mass., 275 sets. Pacific Mills, Lawrence, Mass., 13 sets.

Send to **G. FRANK EVANS, 1288 Center Street, Newton Center, Mass.,** for Illustrated Catalogue.

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HEATING SYSTEMS,
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Samples on request.

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Perfectly adapted materials and a practical common sense way of putting them together, are features which make the Lane Basket so pre-eminently superior to others, for the various uses of a textile mill.

It is the original Canvas Basket and embodies desirable features which are patented and will not be found in any other basket.

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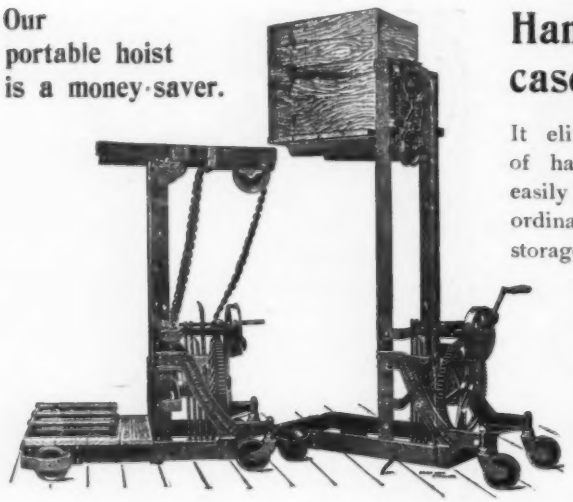
Round Basket with Renewable Hard Wood Shoes.

W. T. LANE & BROTHER, Manufacturers,

Sold by Principal Mill Supply Houses. **POUGHKEEPSIE, N. Y.**

Our portable hoist is a money-saver.



Handles all kinds of bales, cases and packages.

It eliminates the old time-consuming way of handling heavy goods. One man can easily lift 800 lbs. to the top of an ordinary store house. The saving in storage room alone will soon repay its cost. In use in many representative mills. Entire satisfaction guaranteed. *Send for catalogue and list of users.*

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Bar Belt Dressing

Appeals to a man's common sense. Proves its worth every time it is tried on a slipping belt.

Call on your dealer or send us 2c. for a testing sample stating if for Leather, Rubber or Canvas belts. No ONE kind is good for ALL belts.

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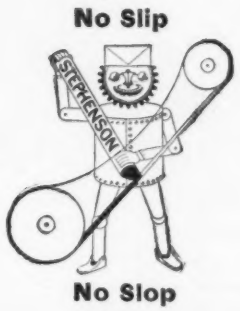

Pulley and Gear Forcer.

We build a simple, powerful and very effective machine to remove gears and pulleys from shafting. Many mills use them. **Only costs $8.00.** Saves its cost in time and breakage.

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on a rawhide pinion corresponds to the Sterling mark on silver—it denotes the highest degree of perfection. New Process Raw Hide Pinions are the recognized standard of excellence. Owing to patent and secret processes of curing the raw hide, they contain much more of the vital fibre than other raw hide, and **wear like iron.** They provide a **noiseless positive drive**—no noise, no loss of power. Get our free booklet for the facts.

We also make accurately cut and planed Metal Gears, in Spurs, Bevels, Internals and Racks.

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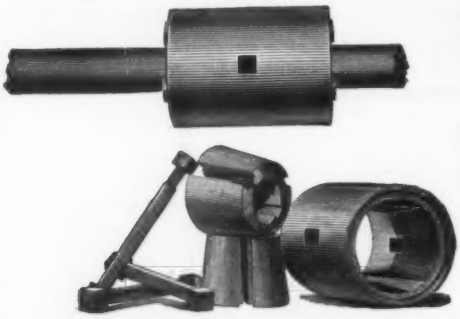

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DOUBLE CONE VISE COUPLING

has a way of holding shafts together, that no other COUPLING can equal.

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ESPECIALLY ADAPTED FOR MILL USE.

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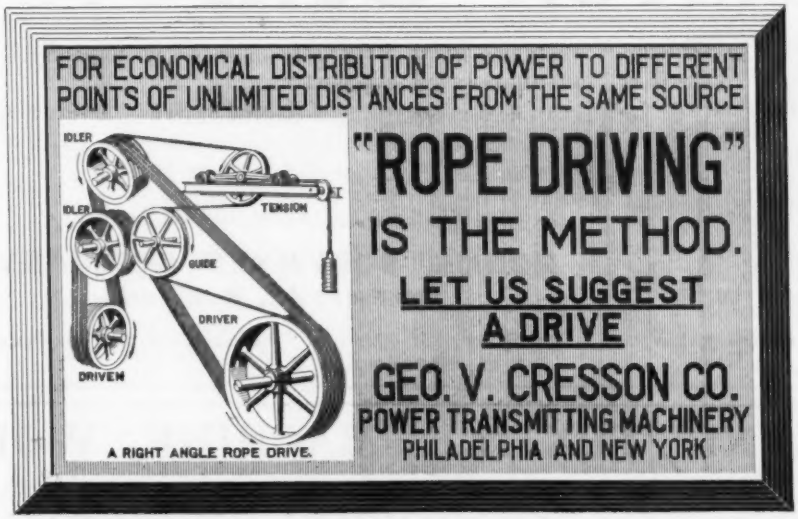

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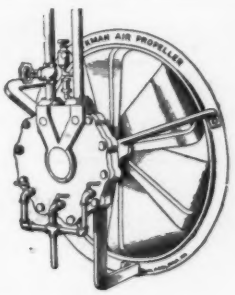
Avoid cold weather Dye house troubles by installing a Blackman Fan.



It will keep the fog out of your way and make it possible to work right up to your summer production both as to quality and quantity. It has a much greater range of application for economy and effective results than any device ever offered. I guarantee positive results. Let me refer you to plants where it has been in long and successful operation.

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An all-steel long-service pulley specially designed for mill use—The Latshaw.

Has interchangeable metal sleeves which fit shafts of any size within reasonable range. Made of the best mild steel and weighs about half as much as a cast iron pulley. Spokes are small offering little resistance to the air. Held to the shaft by compression alone (drilled and tapped for set screws if you prefer.) Saving of power and safety at high speed are attained by its use.

Write for full details.

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BRETON COMPOUND

Acknowledged the peer of soaps for Saponifying Wool Oils for batching.

Economical — Softens the Fibre — Does Not Evaporate — Does Not Gum or Clog the Cards — Can Be Used Alone for Light Batching.

Order trial barrel, subject to test.

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TEXTILE MACHINERY BUILDERS

Improved Woolen, Worsted and Cotton Reels, Ring Twisters, Spoolers, Balling Machines, Sun Gill Boxes, Gill Box Screws, Fluted Rollers of all descriptions, Butterworth Rag Pickers and Lumpers, also all Repair Parts for Pickers, Collars and Steps for Self-acting Mules, Setting up and Lengthening Self-acting Mules, Movers and Erectors of all kinds of Cotton, Woolen and Worsted Machinery.

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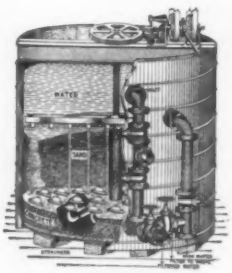

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An organization of experts in the various departments of water purification, giving especial attention to the engineering and chemical problems involved and offering its services as contractor to those wishing to install a water purification plant for any purpose with the assurance of obtaining maximum results and the most advanced ideas.

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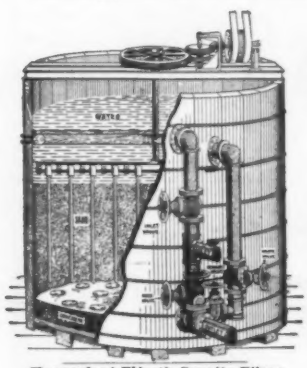

Hungerford-Elfreth Gravity Filter.

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FILTERS PRESSURE and GRAVITY

WATER SOFTENERS INTERMITTENT and CONTINUOUS

There is only one Filter, the

HUNGERFORD - ELFRETH,

the only filter which exceeds its guarantee.

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Philadelphia Water Purification Company,
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BLEACHERIES ARE RAPIDLY ADOPTING THE CELL SYSTEM for opening and drying their goods as drawn in ropes from the bins. The string of cloth is opened up by a scutcher, passed through a water mangle, over an expander, through a Cell Dryer, and is wound on a winder which does not have to be stopped to remove a roll of cloth. A speed of 125 yards may be maintained, if desired, even on heavy goods. A two string machine gives, then, a production of 250 yards of cloth per minute, from rope to roll. Only one attendant is required for the complete plant. The whole outfit takes up but 15 to 20 feet of floor space. If interested send to 15 State Street, Boston, for photographs and blueprints.

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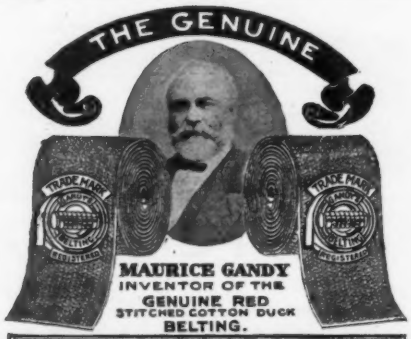

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PATENTED 1877

"GENUINE GANDY"

stamped on every 10 feet on a red stitched cotton duck belt is an absolute guarantee that it will run in steam, acids, gases, heat or water without injury,—thus making it invaluable for bleacheries, dyehouses and textile mills in general.

BEWARE OF IMITATION,—

Every Red Stitched Cotton Duck Belt is not Gandy by any means.

THE GANDY BELTING CO.

BALTIMORE, MD.

Exhaust Fans

Crocker-Wheeler 36-in. Vertical Fan Outfit. See Bulletin 54-Y.

FOR VENTILATING AND FOR REMOVING STEAM FROM THE DYE HOUSE.

Crocker-Wheeler Company,

Ampere, N. J.

It Is So Easy,

so very much easier to stick to what you have been using for a long time, than to make a radical departure, and try something altogether new. Yes, it certainly is, but the cost of such blind loyalty is often excessive. We have lots of regular users of our Leviathan Belting, who, for many years clung to leather, as the only really best belt possible. To what experienced men they knew said in praise of Leviathan may be traced their profitable and permanent awakening. A brief booklet for the busy belt skeptic. Shall we mail it?

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Oils
E. W. Murphey & Co.
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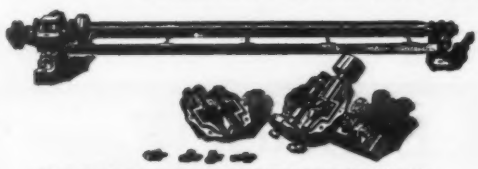
SIXTH, CAYUGA AND WINGOHOCKING STS., PHILADELPHIA, PA.

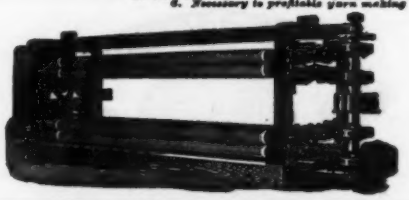


FAST-RUNNING NON-OIL-LEAKING DOFFING COMB

1. For Cotton, Woolen and Worsted Cards
2. Can be run at highest speed
3. Working parts always in oil
4. Adjusted by Single Screw
5. Durable and cheap

DOUBLE APRON CONDENSER

1. Increases production 10 to 40 per cent.
2. Improves quality
3. Adjustable to fine or coarse numbers of yarn
4. Equipped with perfect Aprons, plain or "pocket"
5. For working on every grade of stock carded
6. Necessary to profitable yarn making



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He is happy all the time because he uses

J. S. TURNER MFG. CO.'S COMB APRONS

Write us and we will tell you why they give such satisfaction.

All Comb and Roll Work promptly attended to. Special attention to repairs. Leather Belting. Leather Aprons.

398 Middlesex Street, - LOWELL, MASS.

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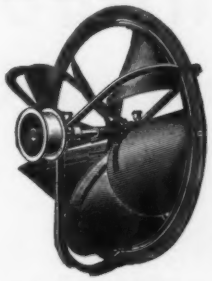
are hard days on operatives and *the pocket-book of the man who pays the bills* unless good pure air is kept constantly moving in every room. Live air means live employees. *Push up the profit by purifying the air.*

The Berry Wheel is unsurpassed for moving air and drying textiles.

This is our Berry Wheel, the most effective agent for moving air, eliminating steam and other impurities in the atmosphere.



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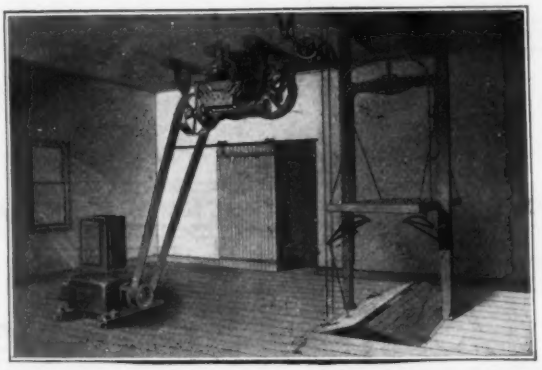
THE MORSE FREIGHT ELEVATOR



For some reason the Morse Freight Elevator has a reputation; and has had for a good many years past. This reputation can only be explained by its being deserved.

After keeping ahead of the times for thirty years, after over 16,000 installations, after grappling with every problem—belt drive from shaft; gas engines, direct and alternating current electric motors—we can say the Morse Freight Elevator is as near right as we know how to make it.

Our alternating current controller keeps starting current so low that Electric Companies permit installation of our elevators on lines where Electric Elevators were formerly prohibited.

The large army of Morse Elevator users have spread the news of its goodness. If it's good enough for them isn't it good enough for you?

If interested in elevators write us.

Morse, Williams & Company,

Department of Otis Elevator Company.

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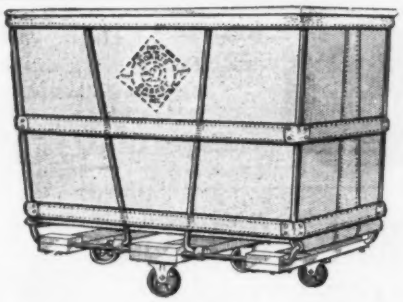
Stand the hardest service—

Morris Duck Baskets and Trucks

A recent order from a $3,000,000 Mass. Corporation calls for 52 of the type here shown.



This is an ideal combination for the *rapid*, *economical handling* of material and goods. Patented Metal Top covers rim and doubles the life of the basket. Write for Catalog No. 6.

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REGULATOR CO.

BOSTON, MASS., U. S. A.

Belt Shifters
Balanced Valves
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Pump Governors
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Pump Pressure Regulators
and other devices for regulating pressures of steam, air and water.
Write for our Catalogue.

This Trade mark on every package.

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Look out for YELLOW Label.

There is only **ONE**

ALBANY GREASE

AND WE ARE THE ONLY MAKERS.

We have solved the problem of economical lubrication.

Cost of using oil

Cost of using Albany Grease

OUR SPECIAL OFFER, a Sample Can of Albany Grease with an Albany Grease Cup free of charge or expense for testing. Always give the name of concern. The only information necessary to send is pipe connection in bearing, DEPTH OF OIL HOLE FROM TOP OF TAP TO JOURNAL, and give particular part of machinery on which the same is to be used.

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LATEST PATENT.

Hall's "Can't Slip" Spindle.

CORRESPONDENCE SOLICITED.

I. A. HALL & CO., Paterson, N. J.

TIME CHECK 100 O. I. B. S. CO.

FACTORY TIME CHECKS

They are being used more and more

Write for our pamphlet "Time Checks and Their Use"

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Successors to The Bridesburg Mfg. Co.

In the Manufacturing of **SPINDLES,**

For Cotton, Woolen, Worsted, Silk and Flax Machinery. Manufacturers and Repairers. Also Flyers, Steel Caps, Bolsters, Steps, Tubes, Etc.

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OPENING FINISHING, DYEING,

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SEWING FRENCH NAPPING, ETC., ETC.

SOFT WATER

There is no excuse for producing Goods *inferior in* Color, Texture *or* Quality *just because a natural supply of* Pure, Clear, Soft Water *is not provided.*

We can cheaply and effectually give a quality of water that will leave nothing to be desired. Scale and Corrosion *in* Boilers *will also be prevented.*

Let us place our Catalogue before you.

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Vulcan Fibre Roving Can.

BODY—Vulcanized Fibre. SIDE SEAM—Riveted with Patented Clinched Rivets. RINGS—Tinned Steel, Brazed Joints, Curled Edges. BOTTOM—IXXX. Tin Star Corrugation; Fastened without the use of nails or screws, will not crack, warp or shrink and cannot come out. FINISH—Coated inside and out with moisture proof coating, handsome and smooth. WEIGHT—About one-half pound per inch diameter. SIZE—All cans to any exact size, perfectly round and true. DURABILITY—Superior to any other can.

Also Manufacturers of

HILL'S IXXX TIN AND GALVANIZED IRON DYE HOUSE CAN.

James Hill Manufacturing Co.,

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LOOMS

For PLAIN and FANCY WEAVING.

Represented in the South by

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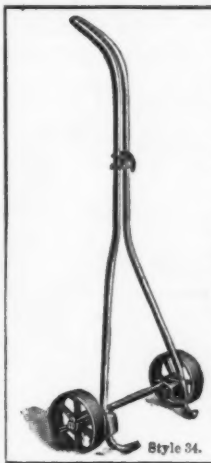
The Yale & Towne TRIPLEX BLOCK not only has a high initial efficiency but it deteriorates very slowly. The main gearing has eight times the wearing surface of that of a "just as good" block. This explains why the TRIPLEX is in good shape years after other chain blocks have gone to the scrap heap.

See your dealer.

Yale & Towne Mfg. Co.

9 Murray St., New York.



Style 34.

Clark's Ash-Can Truck

a very handy and useful article around the furnace and cellar.

Frame of Truck is made of one piece of round steel, bent so as to form two hooks to hook into bottom of can, while an adjustable hook on handle grips top of can and keeps it from slipping.

Write for prices, stating the number wanted.

The Geo. P. Clark Co.

Dept. "C," Windsor Locks, Ct.

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DYE HOUSE FLOORS

We solicit correspondence from New England Mills and Manufacturers who want ACID PROOF, WATERTIGHT, DURABLE Dye House and Mill Floors—at reasonable prices.

Simpson Bros., Corporation

ENGINEERS and CONTRACTORS

Long Distance 'Phone, Main 6657. **19 Federal St., Boston, Mass.**

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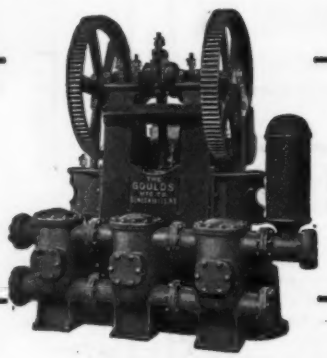
Acknowledged to be the highest in efficiency of any pumps built —that is they deliver more water with less expenditure of power than pumps of any other design and they are therefore known as

EFFICIENT TRIPLEX POWER PUMPS

And are the standard of excellence everywhere.

The **Goulds Mfg. Co.**



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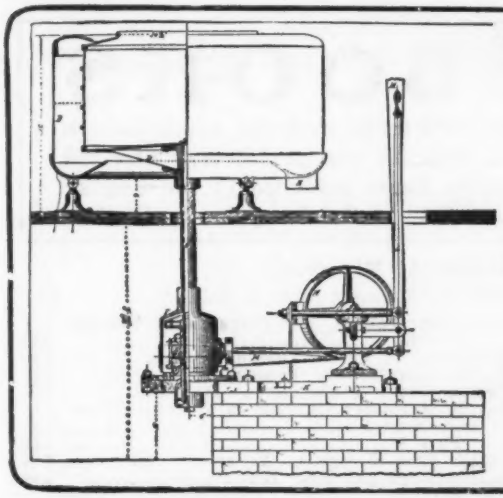

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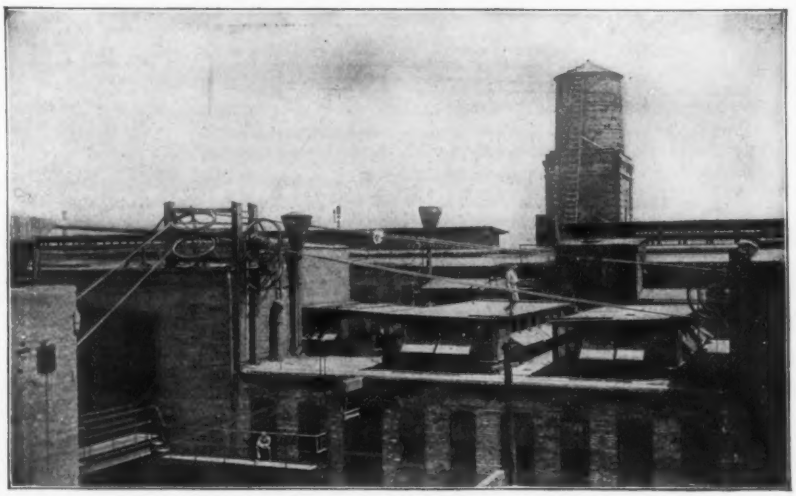

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PART I. Contains a complete directory of all the textile establishments in the United States and Canada. It tells what goods are made, the number of sets of cards, spindles, looms, whether and what they dye or finish, steam or water power, who the selling agents are, the names of the officers, superintendent and buyer.

There are 22 textile maps; gives population of town and railroad connections.

PART II. Is the Yarn Trade Index, containing classified lists of yarn spinners, arranged according to kind of yarn, size and number spun, etc. All the mills with worsted machinery are included in this section.

PART III. Contains Classified List of mills doing order and commission work, also dyeing, finishing, bleaching and printing establishments, classified according to the kind of work done, and so far as possible giving width of goods handled; also shoddy, extract and flock manufacturers and wool scouring establishments.

PART IV. Manufacturer's Selling Agents and Dry Goods Commission Merchants, giving the name and address of concern, character of goods handled, different departments, with managers, list of manufacturing clothiers, and suit and cloak manufacturers, giving specialties and buyers' names. A list of city offices of textile mills is given.

PART V. Dealers and Brokers in raw materials and stock, including wool and shoddy dealers and brokers, cotton dealers and brokers, factors and buyers and wholesale rag dealers making a speciality of textile interests.

PART VI. Buyers Index of Textile Machinery and Supplies, and statistics showing textile machinery in the United States, giving spindles, looms, knitting machines, etc.

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Is published early each year by LORD & NAGLE CO. It is a complete directory of all the establishments in the United States and Canada manufacturing knit goods. It gives the location of the mill, the capital stock, names of the officers, superintendant and buyer, class of goods made, the machinery, including number of knitting machines and sewing machines, selling agents, if any, and in most cases the class of yarn bought. It also contains a list of commission houses making a specialty of knit goods, and jobbers and large retailers having knit goods department, in most cases giving the names of manager in charge of knit goods. The book is small so that it may be carried in the pocket. Price is $1.00.

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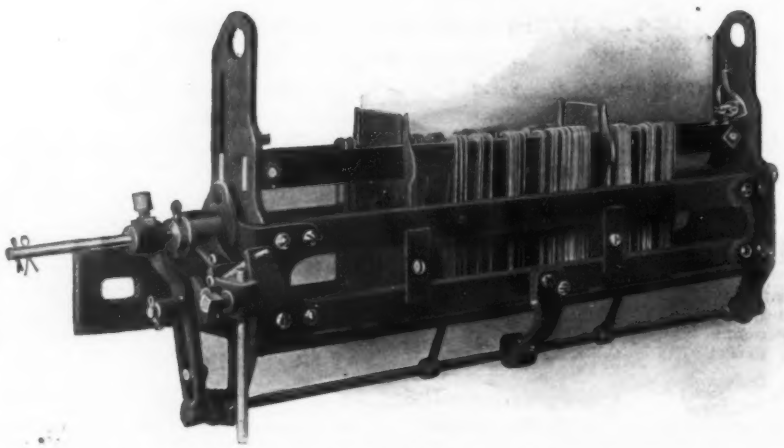

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Table of Contents for September.

PAGE

Monthly Comment 65
Seasonable Fabrics 70
Insurance and the Baling of Cotton 72
Meeting of the National Cotton Manufacturers' Association 73
Meeting of the Woolen Overseers' Association of Eastern Maine 95

TEXTILE PROCESSES.
Spotting with an Extra Warp in Woolen, Worsted and Cotton Dress Goods — The Importance of Shading to Woolen Fabrics — Some Causes of Imperfections in Worsteds—Lustre Finish on Woolens—The Finishing of Fancy Cassimeres—Advantages of Steaming Woolen Yarns 96
The Cost of Woolen Goods 112
Testing Sized Yarns 114
English Notes 114
The Sizing of Cotton Yarns 118
Standard Wage List for Card Room Operatives 120
The Effects of Twist on the Breaking Strength of Yarns 121
Top Roll Covering 123
The Cord Knotter on the Self Binding Harvester 124
Cut Marks 126

QUESTIONS AND ANSWERS 127

KNITTING DEPARTMENT.
The Knit Goods Situation—Warp Knitting—A Latch Closer for Knitting Machines—An Improved Undergarment—Questions and Answers—Mill News 131

NEW MACHINERY AND PROCESSES 144

DYEING, BLEACHING, PRINTING, ETC.
Influence of Various Chemicals on the Felting Properties of Woolen Yarns—Carbonizing Woolens—Turkey-Red Dyeing—Dye Recipes . 156

MILL NEWS 164
PERSONALS 171
NEW PUBLICATIONS 176
BUSINESS LITERATURE 177
RECENT TEXTILE PATENTS 180
COTTON MARKET 207
WOOL MARKET 209
YARN MARKET 211
RAG AND SHODDY MARKET 221
DYES AND CHEMICALS 222

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The Textile World and Textile Record.

VOL. 31 (NEW SERIES.) SEPTEMBER, 1906 No. 6.

Monthly Comment.

The Folly of It.

Some journals that ought to know better are taking seriously the absurd proposition to impose an export tax on cotton in order to confine the manufacture of cotton goods to the United States. The scheme involves compensating the planters by the payment of bounties on the cotton crop.

The first obstacle to this plan is the Constitution of the United States, which forbids duties on exports. But even if it were legally possible, the bounty system would make it practically impossible.

The Shortage of Help.

The hot weather this summer increased the scarcity of mill operatives. Manufacturers with their books loaded with unfilled orders for goods have seen the production of their mills decrease and the cost increase because of idle machinery. The experience of one New England yarn salesman during the dog days illustrates a general condition. One morning he was summoned peremptorily before a weaver who had contracted for large deliveries of yarn. The salesman was forced to listen to a violent harangue of half an hour, in which he was called to account for the non-delivery of the goods. From this interview he went to the spinner by rail and on the way watched several large excursions of happy mill operatives who were on their way to the beaches. They had money for their vacation and were wearing out cotton goods apparently without a thought of spinning or weaving more. When the salesman reached the spinning mill he found it stopped. A demand for higher wages has been followed by a strike that morning. Although the full demand had been conceded the operatives had decided they would not go to work until the next morning.

All this is prosperity, but it did not alter the fact that both the spinner and the weaver were losing money by the inability to get the contracts for yarn filled. Since the weather has become cooler the help have shown a disposition to work more steadily, but in spite of this a large part of the textile machinery throughout the country variously estimated from 10 to 20 per cent., is idle, waiting for operatives.

Foreign Trade in Wool and Woolens.

A reduction in the imports of wool and an increase in the import of woolen goods are the leading features of our foreign trade in those lines for the year ending June, 1906. Compared with the preceding year the decrease in wool imports was from 249,000,000 lbs., valued at $46,220,000 in 1905 to 201,700,000 lbs., valued at $39,070,000 in 1906. The decrease indicates that manufacturers

purchased foreign wool in 1905 somewhat beyond their requirements. One result of the decrease is the softening of wool prices abroad. Since the rise in the domestic price of wool to its present level the use of wool has decreased and that of cotton and other substitutes has increased correspondingly. The details of the wool exports and imports for the last year are given in the following table in comparison with those for previous years:

EXPORTS AND IMPORTS OF RAW WOOL, YARN AND WASTE.

Lbs. in units of one million. Value in units of $100,000.

Year Ending June 30.	EXPORTS.		IMPORTS.					
	WOOL.		WOOL.		SHODDY, NOILS, ETC.		YARN.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
1890	.231	.335	106.3	152.6	5.0	20.5	3.5	19.9
1891	.291	.394	129.3	182.4	1.2	4.3	2.0	11.9
1892	.202	.306	148.7	196.9	.3	.9	1.3	7.5
1893	.091	.148	172.4	210.6	.3	1.1	1.2	6.9
1894	.520	.906	55.2	61.1	.1	.5	.5	3.6
1895	4.289	4.844	192.8	229.9	14.1	19.8	2.4	11.7
1896	6.945	8.559	228.4	315.0	18.7	26.5	2.0	10.5
1897	5.271	6.199	366.6	567.5	49.9	69.3	1.8	9.6
1898	.121	.180	132.8	167.8	3.3	6.9	.3	1.9
1899	1.683	2.373	76.7	83.2	.3	.7	.2	1.1
1900	2.200	3.872	155.9	202.6	.4	.9	.2	1.3
1901	.200	.240	104.0	125.2	.6	1.8	.2	1.5
1902	.123	.133	166.2	177.1	.2	.6	.4	1.9
1903	.518	.718	177.1	221.5	.3	.9	.3	1.9
1904	.319	.371	173.7	248.1	.2	.5	.1	1.1
1905	.123	.150	249.1	462.2	.2	.8	1	1.2
1906	.192	.290	201.7	390.7	1.2	4.3	.2	1.6

The increase in the imports of woolen goods was distributed among all classes of goods except shawls, the imports of which are insignificant. Carpets showed the largest proportionate increase. The figures, compared with preceding years, are as follows:

EXPORTS AND IMPORTS OF MANUFACTURED WOOLENS.

Value in units of $100,000.

Year Ending June 30.	EXPORTS—VALUE.						IMPORTS—VALUE.							
	Carpets.	Dress Goods.	Flannels and Blankets.	Apparel.	Other.	Total.	Carpets.	Cloths.	Dress Goods.	Shawls.	Clothing.	Knit Goods.	Other.	Total.
1890	.067	....	.409	3.179	.719	4.374	7.5	161.4	242.0	10.1	18.4	19.8	66.2	525.4
1891	.184	....	.265	4.240	.502	5.191	13.7	120.3	182.4	7.2	18.6	12.5	39.7	394.4
1892	.093	....	.244	2.689	.649	3.675	12.9	127.6	164.7	3.5	14.8	11.6	12.1	347.2
1893	.115	....	.242	2.224	.679	3.260	15.8	151.2	164.8	2.8	11.7	14.1	12.0	372.4
1894	2.500	....	.387	3.172	1.685	7.744	9.6	67.6	85.8	1.6	8.6	10.0	7.2	190.4
1895	1.610	....	.498	3.161	1.432	6.701	13.6	163.0	144.0	2.0	10.0	9.4	11.8	353.8
1896	2.252	....	.370	3.653	2.860	9.135	8.9	218.9	199.3	4.5	13.0	25.4	27.4	497.4
1897	1.895	....	.573	2.858	3.150	9.476	7.8	170.1	107.9	4.6	9.8	25.3	27.0	412.5
1898	1.612	.414	.474	4.290	4.074	10.89	17.9	39.6	60.4	.4	7.6	3.9	9.6	139.4
1899	.811	.169	.427	5.388	3.679	10.47	17.6	39.1	59.1	.5	8.3	6.3	5.6	136.5
1900	1.150	.244	1.002	5.654	4.485	12.54	27.5	51.3	58.7	.8	9.9	5.0	6.3	159.5
1901	1.051	.082	1.230	8.060	5.006	15.43	27.0	39.6	53.7	.8	11.7	4.1	5.3	142.2
1902	.867	.070	.883	8.521	4.780	15.12	34.4	48.0	64.0	.5	13.3	5.7	5.2	171.1
1903	.579	.074	.481	12.908	3.187	17.22	37.5	48.6	75.1	.5	19.2	6.7	4.7	196.4
1904	.509	.078	.105	14.577	5.663	19.87	27.9	41.5	82.0	.5	13 0	5.1	5.2	175.2
1905	.646	.155	.815	16.244	2.488	20.35	28.7	39.7	86.1	.6	13.7	2.2	5.4	178.9
1906	.573	.164	.724	16.184	3.549	21.19	46.4	51.6	100.5	.5	16.3	2.7	7.	225

A Child Labor Law in Georgia.

A long step in the right direction has been taken by Georgia in the recent enactment of a child labor law providing that:

No child under twelve years of age shall be employed in factories.

No child under fourteen shall be employed at night work.

No child under fourteen shall be employed in factories unless able to read and write.

No person under eighteen shall be employed in factories unless that person has attended school at least three months during the previous year.

The passage of the law is essential but it is not enough. It must be enforced. The experience with child labor laws has shown that

the greatest difficulty is found not in putting the law on the statute book, but in enforcing its provisions. Unless an efficient organization of inspectors and state police is ready to call violators of the law to strict account the statute becomes a dead letter.

Having enforced the Georgia law the next step is compulsory education. Children must not only be kept out of the mill; they must be kept in the school.

American Cottons in India.

The American consul at Bombay has recently sent a report to Washington which doubtless he thinks will help American manufacturers to develop a market for cotton goods in India. It is, however, an excellent illustration of what such reports should not be. He begins by reproducing that threadbare comparison of American and English exports of cotton goods to India. He then brings forward that clincher, a comparison of raw cotton and cotton goods exported from the United States, and then adds the following familiar lament over the fact that we are not spinning and weaving the cotton we grow:

> Not more than 6 per cent. of the American export of cotton is in a manufactured form, yet we grow three-fourths of the world's supply of cotton and furnish our competitors with the raw material, thereby losing the profits of the capital and the employment to labor that would result from such a vast world's industry. There is something radically wrong with this condition of the cotton trade. Did we manufacture the bulk of the cotton that we grow and export we would thereby control and supply the world's cotton market, giving profitable investment to millions of capital, employment to a vast army of labor, build a half dozen Manchesters within our borders, and furnish the cargo to an American merchant marine.

It is easy for a consul in Bombay to talk in this strain and think he is talking sense, but of what use are such reports to American manufacturers? At the present time the productive force of the American people is fully employed. A large part of the cotton mill machinery, both North and South, is idle by reason of the scarcity of labor. Under such conditions it is ridiculous for American consuls in distant countries to tell us about how to "build up a half dozen Manchesters within our borders and manufacture the bulk of the cotton we grow." It shows how little the consul knows of conditions in his own country.

Instead of sending such reports the Bombay consul might profitably study the methods adopted for the investigation of the Chinese market last December. The special agents charged with that duty wasted no time in telling us how to build up Manchesters in the United States, but sent us samples of the goods that the Chinese were using, and gave us a concise and businesslike statement of the widths, weights, prices, methods of packing, and other details that would aid American exporters to give the Chinese the goods they wanted.

Evolution of Weights and Measures.

The natural and orderly development of English weights and measures is indicated by the increased orders for 100-lb., 50-lb., 20-lb., 10-lb. and 5-lb. weights reported by the extensive manufacturers of weighbridges, W. & T. Avery, Soho Foundry, Birmingham, England. They recently received one order calling for ten tons of weights of these denominations. This indicates the steady disappearance of the gross weights of 2,240 lbs., 112 lbs., 56 lbs. and the 14-lb. stone.

The English system of weights and measures may not be perfect, but those who would abolish it entirely because of its imperfections ignore the process of natural selection, which is steadily simplifying our standards by eliminating the inferior and retaining the best.

The Manila Hemp Trade.

Under the act of March, 1902, removing the export duty on manila hemp exported from the Philippines to the United States a fine trade has been lost to Europe. Previous to the passage of that law a large part of the hemp used in American mills was bought in England. In 1902 the value of manila hemp imported into the United States from Great Britain was $4,441,083; in 1905 this trade amounted to only $182,349, that is, it had practically disappeared.

Lest We Forget.

The United States was never so prosperous as now. All records of prosperity are smashed to smithereens. Some idea of the advance from that year of adversity, 1896 may be obtained from this comparison of business conditions:

	1896	1906
Bank, Clearings, N. Y.	$2,800,000,000	$9,200,000,000
Corn, Hay, Cotton, Wheat and Oat Crop	1,580,000,000	3,240,000,000
Exports	1,000,000,000	1,628,000,000
Imports	680,000,000	1,180,000,000
Balance in our favor	320,000,000	448,000,000
Railway earnings	1,045,000,000	2,020,000,000
Pig Iron Production	95,000,000	380,000,000
National Bank Deposit	275,000,000	560,000,000
Immigration, number	300,000	1,025,000
Commercial failures per thousand	12	8

Adversity and prosperity may be likened to the ebb and flow of the tide. In 1892 prosperity was at high tide. In that year the people of the United States were well, wanted to be better, and four years later found themselves in a most desperate plight. The man of thirty today was but a boy of sixteen in 1892; the voter who cast his first ballot in 1906 was but a child of five.

By a wise provision of nature, we forget the miseries of the past and look forward with hope to the future. The grown man in 1892 now recalls the years between 1892 and 1896 as he does a dream, or rather a nightmare. The millions of immigrants that have arrived during the past decade know little or nothing of the events of 1892-96 in this country. Because of this change in the population, and because it is now proposed by many to make the experiment that was made in 1892, it is well to recall the results that followed then. This is best done not by personal reminiscence, but by reprinting extracts from the daily press of that time. We have selected a few, most of them from the Boston Herald and Springfield Republican, two journals which were the leaders then, as they try to be now in support of what they call "tariff reform."

THE EXPERIMENTER STARTS WORK.

Washington, D. C., March 4, 1893.—Grover Cleveland was inaugurated president of the United States today. Extract from his address: "The people of the United States have decreed that on this day the control of their government in its executive and legislative branches shall be given to a political party pledged in the most positive terms to the accomplishment of tariff reform."

Washington, D. C., Aug. 13, 1894.—The House passed the Senate tariff bill this evening.

Editorial in the Herald: The passage of the present tariff bill marks an era in our legislation It is the defeat of McKinleyism and its final defeat, if we are not greatly mistaken.

THE RESULTS.

Waltham, July 28, 1894.—It was a sad and sudden blow to the 3,000 employes of the American Waltham Watch Co., and to the whole city as well, when it was announced that the factory would be shut down a week longer than was first planned, and that then only half the employes would be given work. The long brick buildings of the company look like Gov. Russell's word picture of "deserted farms."

Fall River, Aug. 16, 1894.—The Amalgamated Association, made up of all the local textile unions, voted Monday night to accept the reduction under protest.

Fall River, Aug. 6, 1894.—The Cotton Mfrs'. Assn. voted this afternoon to cut down wages 10 per cent. The reasons given for the reduction are the falling off of the market price for prints to 2 5/8 cents, one per cent. off, and the poor demand for goods even at that figure.

OVER 21,000 WILL BE IDLE.

Fall River, Aug. 23, 1894.—In all the mills covered by the manufacturers' agreement notices were posted today informing the help that the mills would shut down tonight. No definite period of idleness is set, though it is generally believed a month is meant. The number of operatives that will be without work tomorrow is 21,795.

Suncook, N. H., Sept. 18, 1894.—After being idle since August 22, the mills here resumed work yesterday (at reduced wages).

North Adams, Sept. 18, 1894.—The 200 employes of the Braytonville Woolen Mill struck today. The superintendent says his mill will be the first to restore the former scale, but as prices are now it cannot be done yet.

Calais, Me., Sept. 19, 1894.—The St. Croix Cotton Mill, which has been closed since May on account of a 10 per cent. reduction in wages, started this morning at the cut rates. There was so great a rush to return to work that the gates had to be closed. Some 1,500 hands applied.

Fall River, Sept. 19, 1894.—There is dissatisfaction in the Weavers' Union regarding the distribution of relief. Many weavers who have been idle four weeks say they are in immediate need and propose to get their share of the funds as soon as possible.

Pittsburg, Pa., Sept. 27, 1894.—The Carnegie Steel Company gave notice today to its 5,000 workmen of a desire to terminate the sliding scale contract. . . . The company claims it cannot continue

to pay the present wages owing to the depression brought about by the tariff uncertainty.

Fitchburg, Oct. 12, 1894.—The Parkhill employes voted today to go back to work at the reduction made some five weeks ago. The hands have lost at least $40,000, and with the shut down of three weeks before $24,000 additional.

Fall River, Oct. 29, 1894.—The manufacturers have won. The weavers voted to go back to work tomorrow morning. The vote was practically unanimous. Many privations have been suffered during this 10 weeks' strike and "vacation." The eagerness with which the help went to work when the mills were opened two weeks ago proved that the operatives needed money. It is figured that over $2,000,000 has been taken from the general channels of trade. Of this amount perhaps three-quarters has been lost in wages by the operatives.

THE EXPERIMENTER GIVES THANKS THAT WE ARE LIVING.

Washington, D. C., Oct. 31, 1894.—President Cleveland issues this proclamation for a day of thanksgiving in part as follows: Let us meet in our accustomed places of worship: Let us meet in to Almighty God for our perservation as a nation. . . . Let us invoke divine approval by generously remembering the poor and needy. Surely He who has given us comfort and plenty will look upon our relief of the destitute and our ministrations of charity as the work of hearts truly grateful.

Washington, D. C., Nov. 13, 1894.—It was finally determined at the cabinet meeting today that there should be another issue of bonds, $50,000,000 of 5 per cents. The bonds will be issued with reluctance and merely as a matter of necessity.

HUNGER, DESPAIR.

New York, Nov. 21, 1894.—The announcement that the relief store for the striking cloakmakers would be opened this morning with a stock of groceries and bread brought an excited crowd at an early hour. There were nearly 500 men, women and children in the block at 7 o'clock. They stood patiently in the pouring rain, waiting for the committee, which came at 8 o'clock. As soon as the door was opened the crowd made a rush, the little store was filled with shouting cloakmakers, and the counter over which the food was handed was carried away. As it fell about 20 persons fell with it, and there was a mixture of kicking, struggling humanity, loaves of bread, herrings, flour and bologna sausages.

Fall River, Dec. 6, 1894.—Failure to find employment drives a man to suicide. Carroll, who committed suicide by drowning yesterday, came here from England 12 weeks ago to secure work as a mule spinner. He made an honest endeavor to secure work, going, with his dinner pail in hand, from his home every morning. Yesterday when near the linen mill, he met an employe of the company and asked him for a knife with which to cut his throat. Being refused he jumped into Mt. Hope Bay.

Pittsburg, Pa., Dec. 24, 1894.—The new wage scale for the Carnegie steel works, posted today, discloses an average reduction of 15 per cent. The high priced men suffer a reduction of 35 per cent.

THE RISING SUN.

Nov. 8, 1894.—The latest returns confirm the reports of the great Republican victory. The majority of that party in the next House will be about the same as the Democratic majority in the present Congress. The Democrats are too dazed to talk.

We have taken but a few items at random from the files of the Herald and Republican. A list of others of like tenor could be extended indefinitely. It is said that a burnt child dreads the fire, though there are many cases to the contrary. Whether that is so or not, there are many who were not burnt by the tariff reform fire of 1892-96. They have come on the scene since with the prosperity under the Dingley bill. They have never missed the water of industrial life by having the well run dry. Many of them are now infected with the virus of discontent. They are lending a ready ear to politicians of both parties, who would rather have office than be right, who first find out what kind of advice the voters want and then give it to them. The politician gets his office, and the country gets it in the neck. For these reasons we have briefly recalled the recent past.

INSURANCE AND THE BALING OF COTTON.

Editor Textile World Record:

I read with interest from time to time the complaints of the disgraceful condition in which American cotton is put up for the market, leading to deterioration of quality, loss of quantity and liability to fire. This latter evil is a great menace to warehouses and ships carrying it, and the recent cotton fires in warehouses in Staten Island and elsewhere have accentuated the evil at this time.

It seems to me that the root of the difficulty could be reached by prompt action on the part of the underwriters. If the various associations of fire and marine underwriters were to refuse, after a given date, set at a reasonable time in the future, to insure on any terms cotton not packed in conformity with specifications laid down by them, we would find an immediate and eager interest taken in this reform by a large number of persons in the various branches of the trade,

who now take little or no interest in the subject.

I do not know if common carriers assume any fire liability for cotton in transit, but if they do they might be induced also to discriminate against this element of danger.

An alternative proposition might be to have insurance rates on cotton baled like the Egyptian made very low, and on cotton as now baled here extremely high, but I would prefer the plan of not insuring on any terms improperly packed cotton. Underwriters' action is generally productive of very speedy results. Mark Twain, in his "Life on the Mississippi," tells how a discredited association of river pilots adopted a plan of having boxes at each landing where pilots going up or down the river left reports of the conditions on the part of the river they had just passed for the benefit of the next comer, they in turn seeing and benefiting by similar reports left by others of the part of the river they were about to enter, and none but members of the pilots' union had access to these reports. It was not long till the underwriters found that for this reason far fewer accidents happened to boats run by union pilots and so compelled all pilots to come into the union or leave the river.

Similarly in the North Sea fishing fleet accidents were common, particularly in transferring the fish in boxes from the smacks to the steamers that took them each day to the Billingsgate market in London. Few of the crew could swim and a man overboard was generally a man lost (to say nothing of broken limbs or ribs), and though the regulations provided for all men to wear life jackets when engaged in this or similar hazardous work, yet the fear of being called cowards made every one refuse to wear them. A gentleman visiting the fleet was so impressed with these risks that he put the matter before the underwriters, pointing out, which was the case, that the loss of a man or two from a smack left the boat so short-handed that, in case of storm, disaster to the boat was very liable to happen. This view of the matter was so sound that the underwriters refused to insure any vessels on which the wearing of life jackets at proper times was not made compulsory, and the men—when everyone had to do it—were very glad to wear them. The underwriters also required that a skilled surgeon should be constantly kept on the "Admiral's" vessel (that is, the boat that directs the operations of the fleet) so that treatment for personal injury to any of the men in the fleet could be promptly given. Now this reform—like most others for that matter—was due to the representations of one man, and he a "rank outsider."

Insurers have lost lots of money by cotton fires and are very shy at present of this risk, and I believe they might be now in a temper that would lead them to take organized action on some such lines as here proposed.

JAMES CHITTICK.

Seasonable Fabrics.

MEN'S WEAR WOOLENS.

The present is a very inactive market—business is quietly dragging along with comparatively little doing. The buyers have departed and the selections they have made and the volume booked is not considered so good as it might be.

It is claimed by the agents that advances are small and only in spots, and that they expected better treatment from the hands of the buyers than what they received. On the other hand the buyers reason that instead of advances there should be a decline, and that the advances made are not warranted. This is probably the cause of the small initial business that has been accomplished. The styling of a number of lines has been changed so that it is hard to tell whether such lines have been advanced, and comparison with such cannot be made.

This represents the general situation and is applicable to the majority of mills and selling agents. There are spots, however, where lines shown have met with such a favorable reception that they have been sold up and withdrawn, but so far as we can learn

the market has been and is devoid of any particular feature with the exception that the call for fancy worsteds has been prominent and pronounced, and that the orders booked for cotton worsteds have exceeded expectations, with the result that it is doubtful if the mills can turn out enough to go around by the time deliveries become due.

The preponderance of orders has been on grey and grey mixtures, and the revival of brown is thus far limited to few styles. There is an apparent tendency in favor of lighter weight kerseys and overcoatings.

Duplicates on heavyweights are being received to a moderate degree for immediate delivery. Cancellations thus far have not developed in proportion to what was experienced last year, and it is hoped that the words of counsel administered by the agents to those buyers who, in the past, have been guilty of this evil, received due weight. A certain amount of revision is to be looked for, but the evil had grown to such proportions that a drastic remedy in the nature of refusing to sell to those who were notorious for their cancelling proclivities, was made necessary.

Among the new lines shown this month are the fancy serges from the Sawyer and Chase Mills at from 95 cents to $1.40. These are shown in Department 5 of the American Woolen Co. There are also shown in the same department mercerized lines from the Manton, National, Providence and Riverside Mills at 95 cents to $1.10.

In Department 2 a full range is shown of fancy worsteds from the Fitchburg and Puritan Mills, price ranging from $1.77 1/2 to $2.77 1/2.

DRESS GOODS.

The opening by first hands of spring woolen and worsted fabrics has been attended by a large number of visiting buyers, and the business achieved is spoken of as normal and satisfactory.

Plain fabrics in black and colors have been taken in liberal quantities, more especially in the lower grade numbers; medium grade fancies in attractive designs have also been well received. This is particularly true on lines of staples on which buyers feel they are running no risks. The demand for black goods is on the increase, and blue—particularly royal blue—greys and tans are thought at present to be the coming season's colors.

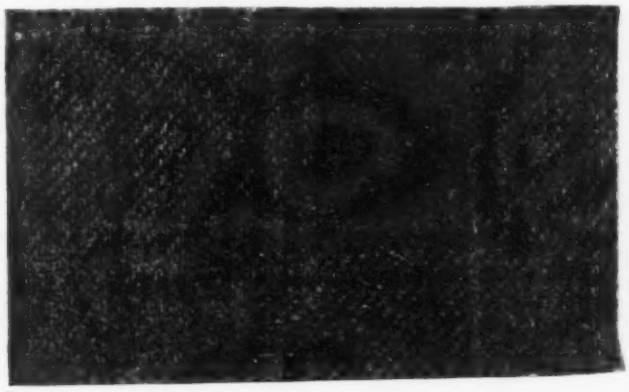


FIG. 1.

For consumption during the present fall and winter season chiffon broadcloth has maintained its supremacy and will probably occupy this position until early spring.

The trend strongly indicates that light weights will prevail for another season. The importers are showing chiffon broadcloth, voiles and wool batistes, both in plain and fancies. There are also shown an innumerable variety of plaids, overplaids and checks. Tartan plaids are very much in evidence in both the foreign and domestic lines, price ranging from 35 cents to $1.25.

Stripes are being revived in plain and mixtures, among the most striking being black

and white even stripes. Large black and white checks are also introduced and are taken quite liberally by the better class of trade. In Fig. 1 is shown a 56-inch wool overplaid mixture termed the Rockingham, shown by E. B. Moore & Company at 57 1/2, 7/10 60.

SILKS.

There is no material change in evidence in the silk market, but business is abnormally quiet for this period of the year, and it appears as if the bottom had been reached. Many of the manufacturers are optimistic and predict a wholesome revival for the spring of 1907 in style, quality and quantity.

There is at present no lack of styles to select from and the better grades possess intrinsic merit. Plaids are selling well, but the quantities taken are small, a half piece of a style being about the average.

Evening silks, such as the pompadour styles, are shown in an immense variety, and reflect great credit to both designer and manufacturer, price ranging from 65 cents to $1.25.

Plain colored taffetas continue to hold their established position, and the quality shown in 19-inch at 50 cents is better than has been heretofore known in the history of the trade, notwithstanding the high price of raw material.

Printed chiffon is one of the new fabrics for evening wear; printed crepe de chenes have also made their appearance and are well taken in limited quantities.

There are a number of lines to be secured of fancy 19-inch taffetas, such as printed warps and other styles that were first introduced a year ago at 55 to 65 cents, that can now be bought around 35 cents net. Concessions can also be secured in bulk quantities of standard goods, such as 36-inch black taffeta. These concessions are made possible by the failure of a number of small mills, and of others that had to realize.

The outlook, however, is more promising and it is more than probable that we shall witness a healthy, prosperous, spring season. In Fig. 2 is shown a new striped taffeta rave from one of the mills of Pelgrave and Mayer, 30 inches wide at 65 cents.

COTTONS.

There are no clouds on the horizon of the cotton market at the present moment. All mills seem to be running to their full capacity with the exception of those that cannot secure enough help. Apparently quotations are higher than is warranted by the decline of raw material, but there is little complaint on that score. The complaints are about the slow delivery of goods bought months ago. This applies to several tickets of wide sheetings, cotton ducks, denims, 4/4 bleached cottons and cambrics, and a variety of other cotton fabrics.

The production of the mills that make ginghams, both dress and staple, are well

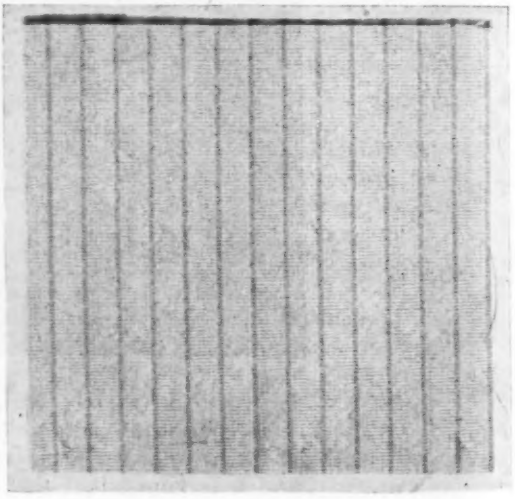


FIG. 2.

conditioned, even in the face of an advance of 1/4 cent a yard on the Amoskeag and 1/2 cent on some of the Southern tickets. Prints share in the general prosperity and all are doing well. Sheer white goods on the order of India linons, Victoria lawns, Persian lawns and goods of an allied character, are well sold up for the spring of 1907, notwithstanding the prediction that the call for colored wash goods is likely to prevail.

The volume of trade from Canada has more than doubled in the last ten years, and the foreign trade is one-fifth as large as that of the United States.

The National Association of Cotton Manufacturers.

The eighty-first semi-annual meeting of this association, held at Hotel Champlain, New York, on September 12 and 13, was marked by a large attendance of members and guests, and by an unusually interesting series of papers.

The fall meetings of this association, which are held at different attractive summer and autumn resorts partake more of the character of pleasant social gatherings than of strictly business meetings. Yet there has seldom been a convention in which the discussions following the reading of the papers were so general or interesting. The beautiful surroundings of this well-known hotel at Bluff Point on Lake Champlain gave every opportunity for full enjoyment in the way of sight seeing, sports, excursions or rest, according to the fancy of the individual. A pleasant feature of these fall meetings is the large number of ladies always present and this convention was no exception in this respect. The business sessions were held in the forenoon and evening, leaving the afternoons free for other purposes.

After the convention had been called to order by Secretary Woodbury on Wednesday morning, the association was welcomed to the State of New York by Attorney General Meyer. The response to this address was very happily made by Arthur H. Lowe, President of the American Cotton Manufacturers' Association. Then followed the address of President James R. MacColl, which was as follows:

PRESIDENT'S ADDRESS.

JAMES R. MacCOLL, Providence, R. I.

Fellow Members and Guests of the National Association of Cotton Manufacturers:

It gives me much pleasure to welcome you all to this convention which is the eighty-first of our Association and the first under our new name. The past summer has been a trying one for cotton manufacturers, on account of the almost unprecedented humidity and its effect upon many mill processes. It is to be hoped that the fine air of Lake Champlain will provide the right kind of tonic to send us home with renewed strength to grapple with the problems of the coming winter.

The change of our name to The National Association of Cotton Manufacturers is justified by the fact that twenty-five per cent. of our membership is outside of New England, and the belief that this proportion will probably be materially increased in the future. As a national association, it is fitting that we should hold our autumn meetings as often as possible outside of New England, and thus keep in closer touch with the members who reside in other States. It behooves us to take an active and aggressive interest in everything that tends to develop cotton manufacturing in our country. We desire to see the Southern states maintain their supremacy in supplying cotton for the world's use, and we should endeavor to cooperate with the growers in a loyal and friendly spirit in their efforts to obtain a fair and profitable return for their product, and to improve the methods of handling and marketing the raw material. Our aim should be to work harmoniously with other manufacturers' organizations, not encroaching on any fields of effort that are covered by them, but ready to do the things that are our special province or are being neglected.

Our Association brings together at its meetings a large number of practical men, and affords opportunity for the public and private discussion of technical questions, and it should be the endeavor of our Board of Government to present papers that cover the latest improvements in machinery and processes, or deal with the commercial problems affecting our industry. Recognizing that the future success of cotton manufacturing in this country in competition with the world, must depend on the training and ability of the men who manage our mills, it is the duty of this Association to encourage textile and technical schools, and the young men who are starting out in the business and who, later on, will be its leaders. While seeking primarily the advancement of cotton manufacturing in our own country, we should be ready to co-operate with foreign associations in correcting abuses and in promoting the welfare of our world-wide industry.

In furtherance of such purposes, our Association took a leading part in arranging a conference of growers and manufacturers, which was held in Washington on May 1 and 2. Considering all the circumstances, it is remarkable that such a gathering should not have been inaugurated many years ago. Two days of friendly discussion did much to correct misunderstandings and hasten needed improvements. It is my opinion that similar conferences should be continued at regular intervals and that they should be made as representative as possible of all cotton growing and manufacturing interests.

Much attention was given to better methods of ginning and baling, and the following resolutions were prepared by a special committee and adopted by the Conference:

1. That all bales be made of standard dimensions.

2. That light weight new burlap be used for bagging, or if conditions justify, that cotton canvas be used.

3. That ten ties be used on all bales, with the Egyptian style of buckle preferred.

4. That all cotton shall be bought and sold net weights.

5. That a committee be appointed whose duty it shall be to have cotton baled as above, and to submit same for practical test to consumers. That this committee shall have power to investigate and report on the various new methods of ginning and baling generally. This committee to report at a future session of the Conference.

At present the American manufacturer pays the price of cotton for bagging and ties, and the foreign spinner, buying on the 6 c. i. f. basis, although apparently getting tare deducted, really pays for it also, as it is added to the price before being taken off. The present method prevents progress in baling cotton, because it is for the interest of the grower to use cheap and heavy covering. The above resolutions suggest the proper remedy, namely, to pay for only net cotton. It will then be advantageous to the grower to use lighter and better material, thereby making a reputation for putting up his product properly. It is a well known fact that the success of many manufacturers lies largely in the careful and artistic putting up of their goods. Thus they secure a better price than their competitors who send out their merchandise in a slovenly and unattractive condition. The same principles should apply to raw cotton. A great deal has been accomplished, if, by direct contact with growers, manufacturers can get them to see that carefully ginned and packed cotton will command a price that will more than repay them for the additional expense incurred. Who can estimate the millions of dollars that are annually thrown away by unnecessary fire losses, insurance, freight charges, waste, labor in manufacturing, and inferior cloth, as a result of the poor manipulation of the raw material before it reaches the mill? It is desirable that this committee of the Conference should energetically pursue the work assigned to it in relation to new systems of ginning and baling.

The Washington Conference adopted resolutions in favor of the change in the cotton year to August 31. As a result of recent scientific effort to combat the boll weavil, earlier maturing types of cotton are being planted, and the quantity of new cotton ginned and marketed in August is therefore increasing. In 1903 only 17,000 bales were ginned in August, and in 1905, 483,000 bales. Mr. Hester of the New Orleans Cotton Exchange has, in a recent letter, approved the suggestion and expressed his willingness to publish comparative statistics for several past years, made up to the new date, thereby overcoming one objection to the change—that it would destroy comparison. Secretary Wilson of the Department of Agriculture and Superintendent King of the New York Cotton Exchange have also favored the alteration.

At the Washington Conference the growers stated their determination to build storehouses throughout the Southern States, for the double purpose of protecting the cotton from weather damage, and of enabling them to market it more gradually during the year, directly to the spinners. This movement has received the cordial endorsement of manufacturers, and we are glad to know from recent reports, that many warehouses are being built. A letter dated August 29, from a prominent official of the Farmers' Educational Union states that one hundred and fifty warehouses have been erected in Texas, with a large central building at Houston, capable of holding 50,000 bales.

I had the pleasure of attending in June the Third Congress of the International Federation of Cotton Spinners' and Manufacturers' Associations, which was held at Bremen. The Federation now represents about 55,000,000 spindles. There was present a large and influential gathering of delegates from all the countries of Europe which spin cotton, except Russia. The City and the Cotton Association of Bremen provided most generous hospitality, and at the close of the sessions the German Lloyd Line entertained the members and guests in one of their steamers for three days at the Kiel Regatta.

The Federation is slowly but surely gaining in solidity and power, and will have to be reckoned with by speculators in any future attempt to unduly inflate or corner cotton. Its members earnestly believe that international combination is necessary to deal successfully with conditions that now prevail or may arise in the future, and that it is important to lay a foundation of international amity and good-will. Throughout the meetings the utmost harmony and friendship were evident.

Valuable work has been done in providing statistics of cotton stocks and consumption in Europe, which, in conjunction with similar reports from the United States Census Bureau, will help to secure stability of price and concerted action in the event of a shortage of raw material. An international commission was appointed to prepare revised rules for cotton exchanges in their dealings with spinners, and definite action in several important matters may be expected when the commission presents its report to the Federation.

A general desire was expressed that some way could be devised to insure a fair and steady price to the American growers, so that they would find it profitable to produce an ample supply for the increasing needs of the world. A carefully-thought-out paper read by Herr Lang of Switzerland, proposing the formation of a company of spinners to buy 1,000,000 bales or more, this cotton to be held as a reserve and sold if the market advanced to a certain point. The buying and selling prices would be fixed in advance of the growing season, so that the purchase price would be a guarantee to the grower and the selling price a preventive of extreme speculation. Copies of this paper will doubtless be received later for distribution, and the subject will be found interesting.

Excessive damp in cotton, with inadequate allowance when discovered, is a grievance which European spinners complain bitterly of. It is possible that in this country we have not given sufficient attention to this, and that a large invisible loss is occurring in many mills. It seems reasonable that after careful scientific investigation a proper standard of moisture can be established, which will be fair both to grower and user. Eight and one-half per cent. regain has been to some extent recognized as the cotton standard. Our Association could do good service by instituting a series of tests to determine the practicability of establishing this as an exact standard for buying

cotton, and I would suggest that our Board of Government give attention to this matter. Those of us who are woolen manufacturers know how essential it is to watch closely the moisture in raw material and finished product.

Another subject for investigation also referred to at the Congress, is the compressed density most suitable for American cotton. The advantages of the Egyptian bale have been frequently touched upon recently, and it has been suggested that a like density of forty pounds per cubic foot would be injurious to American cotton. I should like to see tests made at various degrees of compression, to determine this point.

The New York future contract is being severely criticised at present by growers and manufacturers. It is asserted that the wide disparity between contracts and spots is injurious, and also that contract cotton cannot be bought to any extent by the spinner for actual consumption in his mill, because of the variety of tenderable grades and staples.

The whole question of the future market and its influence upon the cotton industry, is worthy of consideration by every manufacturer. The system of hedging is so much utilized that it would revolutionize the industry to abandon it, if that were possible. Many believe, however, that the evils of the system and the injury to the trade far outweigh the benefit derived from it. It should be remembered that the wool trade of the world is of equal magnitude to the cotton, and that it is carried on without future contract trading. It would be hard to find a wool manufacturer who would like to see the cotton system introduced in his business. Then, again, it is generally understood that Continental spinners seldom use the future contract market, and this may be said also of a large majority of American manufacturers. It is certainly a remarkable perversion of sound business principles, that in the New York Exchange probably 150,000,000 bales of cotton are bought and sold annually, while the contracts that mature and are delivered, require only a few hundred thousand bales to fill them. It is apparent that only a small part of this enormous volume of sales is for hedges against sales or stock, and that the great bulk is for speculative, if not gambling purposes.

I would suggest that the International Federation and the United States Census Bureau should ascertain from spinners in their next annual September report, the number of bales they have bought and sold in the future contract market. It would be interesting information, and might lead later on to legislation that would provide accurate statistics of the cotton bought and sold on future contracts in the various exchanges of the world.

The present New York future contract permits the delivery of any or all of thirty grades, including tinged and stained, the basis being Middling and the differences ranging from 1.50 cents off to 1.30 cents on. The most undesirable cotton is of course always delivered on contract, and each 100-bale contract may contain a large variety of grades, and also inferior staple. The result is shown in the present position, that New York contracts for the present month are quoted one and one-eighth cents less than spots in New York, and one-half of a cent less than spots in New Orleans. As a remedy it has been suggested to reduce the number of tenderable grades by excluding some of the lower grades that are now accepted. It is claimed, however, by many experts that a limitation of tenderable grades would render corners more easy, and that such has been the past experience in New York and Liverpool. If this be true, it is unwise to urge a change which might create a worse condition than now exists. Another plan advocated is to make the difference between grades more equitable and harmonious with market values, to adopt a minimum standard of deliverable staple, and to require that each 100-bale contract shall be uniform in grade, or vary, say, only one-half grade up or down.

It is unfortunate if New York becomes a purely speculative centre instead of the large spot market for cotton which it might be, and it is to be hoped that the more conservative element in the Exchange will endeavor to bring about conditions more in harmony with the needs of spinners. Even from the standpoint of hedging, it is important that contracts should remain in closely uniform relation to spots, in order to be safe for the spinner to use.

The Bremen Cotton Exchange has a membership about evenly divided between spinners and merchants, and its marked growth and success are attributed to their cordial co-operation. Representatives of the spinners are on the directorate of the Liverpool Cotton Association. It would, in my opinion, be advantageous for the New York Cotton Exchange to associate in some way representative manufacturers in its counsels, and thus add to its usefulness and power.

The equalization of conditions of labor in the Northern and Southern states continues. South Carolina manufacturers have voluntarily adopted a sixty-four-hour schedule, to be followed in two years by a further reduction of two hours and in four years by a sixty-hour schedule. Other states will undoubtedly follow suit. The minimum age of child labor is also being lowered. The day seems now much nearer when practical uniformity as to hours, wages and age limit will prevail throughout the country, and this not solely by legislation, but to a large degree by voluntary action.

The wave of tariff revision and reciprocity is subsiding. Under the present law there is marvelous prosperity, in which all classes of the people are sharing. Common sense says, "Let well enough alone." Reciprocity is found upon investigation to mean the sacrifice of one section of the country or one industry, that another section or industry may grow more rapidly. In nine years under the present tariff the national exports have increased from $1,032,000,000 to $1,717,000,000, which places the United States in this respect in the first rank among the nations of the world. With labor and capital fully employed and unable to meet the demand, it would surely be folly to reduce duties and buy more foreign goods, in order to increase our exports by an equal amount. The chances are we should accomplish the former but not the latter.

There are no very important advances in machinery to chronicle at this time. It is little by little that progress is made. Many minds are at work in this country and abroad and continually

new devices are appearing to improve quality or cheapen cost of labor. At our last meeting a paper was read on reinforced concrete construction. The cost of building is greatly increased in recent years, and it would be of advantage to the trade if any new and cheaper method could be adopted. As the principles of reinforced concrete construction become better understood and its cost reduced, the probability is that it will be extensively applied to cotton factories.

We ought to have a paper at our next meeting on recent mill construction in England where approximately one hundred new mills have lately been erected.

Electric driving of machinery continues to make rapid progress. Two papers on this subject are on our present program. The turbine engine is now attracting much attention, and an important paper will be presented on that topic.

As a result of a recent European trip a few observations of comparative conditions here and abroad may be of interest. My opinion is that the best practice in cotton mills in England and on the Continent and in the United States is practically on a par of efficiency as regards machinery and management. There are few secrets nowadays in cotton manufacturing. New devices and methods wherever originated are quickly known on both sides of the ocean and if meritorious, they are as quickly adopted by the most progressive mill men.

In all countries there are many illustrations of inefficiency and slipshod work and more than ever before, what counts in results is management, both commercial and technical.

The different systems of buying cotton are noteworthy. In Bremen there is no future contract market as in New York or Liverpool, nor is there any accumulation of spot cotton, but the system prevails of buying for future delivery, cotton of fixed grade and staple. The exchange has an organized system of arbitrating cotton on arrival, if so requested by the buyer. Last year 1,933,000 bales were imported and 1,778,000 or about 92 per cent. were so arbitrated. Not only is the market difference allowed on inferior shipments but an additional penalty is imposed. It is, therefore, so expensive for a merchant to deliver inferior cotton, that the shipments are generally up to the standard ordered. The Arkwright Club has recently issued revised rules for buying cotton. They are excellent, but we need in addition a definite statement of the methods of settlement in the event of shipments proving inferior. The Bremen penalty plan is a good one.

In Liverpool there is a future contract market similar to New York, but in addition a large stock of spot cotton is carried amounting frequently to 1,000,000 bales. The most general method of buying cotton by English spinners, is to purchase spot cotton as needed, at points on the contract market price. Distant requirements can be hedged by buying futures, or actual cotton at points on subject to call.

There is danger of New York becoming purely a hedging and speculative market. Compared with Liverpool or Bremen, its transactions in actual cotton are unimportant.

Negotiations are now in progress in England to arrange an automatic adjustment of wages based either on the return to capital or on the margin between cost and selling price. If this can be brought about it is hoped to avoid the conflicts which have been so expensive both to capital and labor in the past.

Both abroad and here there is marked development in welfare work, indicative of better relations between employers and employes. At our Atlantic City meeting special attention was given to this subject. Every cotton manufacturer should do some work of this kind, but the form which it assumes must be dependent on the conditions and requirements existing at his mills.

In closing, permit me to express the desire and hope that the sessions of the Convention may be faithfully attended, notwithstanding the charm and beauty of the place where we meet, and that there may be ample and instructive discussion of the subjects to be dealt with.

Much interest was shown in President MacColl's address, especially that part referring to the work of the International Federation of Cotton Spinners' and Manufacturers' Associations, which recently held a congress at Bremen, where President MacColl was in attendance. After the president's address Louis Simpson of Valleyfield, Quebec, asked for information regarding the report made by the English manufacturers who visited the United States last spring. Mr. MacColl stated that when he was in Manchester a few weeks ago the members of the English delegation were still struggling with the report, and that when it was completed it would be presented to the manufacturers who had sent them to the United States.

Mr. Lowe then asked Mr. MacColl if it was not possible to co-operate with the International Federation in its work, which seemed to be in harmony with the interests of the American associations. To this question Mr. MacColl replied that it was desirable to cultivate friendly relations with the European federation, but that it was impossible for American manufacturers to enter unconditionally into the work of the foreign federation. European manufacturers have special interests that they only can care for.

Next came the reading of the following paper by Christopher P. Brooks, of New Bedford, Mass.

A REVIEW OF RECENT PROGRESS IN TEXTILE EDUCATION IN THE UNITED STATES.

CHRISTOPHER P. BROOKS, New Bedford, Mass.

Seven years ago this fall I had the pleasure of addressing this Association on the subject of Textile Instruction by Mail and also at previous meet-

ings on other branches of textile education. When the Board of Government recently requested me to again discuss this subject, I could not conceive of a better method of dealing with it than to review the progress that had been made in textile education in the United States since that date.

Seven years ago we had but two textile schools, the pioneer American institution of the present textile educational system, namely, the Philadelphia Textile School, which is a part of the School of Industrial Art of the Philadelphia Museum of Philadelphia, Pa., and the then newly established Lowell Textile School of Lowell, Mass. These represented residential textile education, while the American Correspondence School of Textiles, now the Textile Department of the International Correspondence Schools was the sole representative of correspondence textile education.

In the intervening period the Philadelphia Textile School has increased its curriculum, and the Lowell school has moved into a new building and extended its scope by the addition of instruction on several subjects of an allied nature; the Commonwealth of Massachusetts, jointly with the city of New Bedford has established the New Bedford Textile School, which was opened in October, 1899, and has since been twice enlarged; in March, 1904, the Bradford-Durfee Textile School of Fall River, Mass., was opened under the auspices of the Commonwealth and the city in which it is located. Nor have other communities been unmindful in providing facilities for the textile education of their sons, since the Georgia School of Technology has added a Textile Engineering Department which is well and favorably known in the South for its completeness and efficiency. In South Carolina textile instruction is now included in the work of the Clemson Agricultural College. The North Carolina College of Agriculture and Mechanic Arts has added a Textile Department to its educational work at West Raleigh, N. C. The Mississippi Agricultural and Mechanical College includes a well equipped Textile Department, and in Texas the possibility of a textile education has been provided for by the addition of a department devoted to textile subjects at the already extensive Agricultural and Mechanical College at College Station, Texas.

On a smaller scale facilities are provided in some cities for teaching textile subjects on which instruction can be given without an extensive equipment; for example, the Swain Free School of New Bedford, Mass., gives instruction in textile ornament; the Rhode Island School of Design, Providence, R. I., includes textile designing as one of the studies; and at the Y. M. C. A. in Pawtucket, R. I., and also at Adams, Mass., evening students are received in classes of instruction on textile calculations. It will thus be seen that each of the larger sections of the United States where textile manufacturing is conducted, has one or more representative residential textile schools; but they only meet the popular demand in their own immediate vicinity, since they are too remote from very many extensive manufacturing cities and towns for the work people to take advantage of the evening classes. In the Southern schools evening classes are not conducted. In the Philadelphia school, the evening classes are an important feature of the school work and in the New England schools the most important.

The National Association of Cotton Manufacturers has repeatedly shown its approval of the movement in favor of textile education, as is evinced by the annual offer of medals, one to each of the larger textile schools, for the student of the graduating class who shows the greatest excellence in his studies. It is also the custodian of the trust created some years ago by William Firth of Boston, Mass., providing for a free scholarship valued at $120 per year tenable at the New Bedford Textile School by the son of any member of the Association, the beneficiary being nominated by our Board of Government; the museums and libraries of the various textile schools contain contributions by the Association made from time to time, which prove the practical interest of the Association in the textile educational movement.

In the point of the number of schools, the United States is behind the European nations, but in equipment and extent of studies our schools compare very favorably with those abroad.

Important as is the increase in the facilities for residential school education, the most striking development has been in providing facilities for, and the success that has attended the giving of a textile education by correspondence.

When I last addressed this Association seven years ago on this subject, the importance of this fact had become impressed on my mind and I had then provided facilities for giving a technical education in textile subjects by correspondence, which were already being taken advantage of by a few hundred students throughout the United States. The success that has been met with in this movement has been such that now there are several thousand men enrolled for correspondence textile courses in the school under my supervision, representing not only every textile city or town but every mill of any importance in the United States and Canada. These men have the option of selecting any one of fifteen textile courses of study, in which they are instructed by means of printed lectures prepared with the greatest care and accuracy, illustrated to a perfect degree, and in pursuing their studies they receive the assistance of competent instructors. As each lesson is studied an examination is submitted by the student and passed upon by expert examiners. Upon the satisfactory completion of this work the student is provided with a more advanced paper or one on another subject, according to the course for which he is enrolled.

The length of time required for a student to complete a course of textile instruction by correspondence depends largely on the particular course for which he is enrolled, complete courses of course requiring a much greater length of time than do partial courses. It also depends a good deal upon the natural ability of the student, his previous education, habits of application and the time that he is able to devote to study. In exceptional cases students have completed our short courses in three months and our longer ones in a year, but in the great majority of cases a longer time is required. The student, however, does not have to complete his course before beginning to derive benefits from it, since every instruction paper that he masters fits him for some particular branch of the work which he is qualifying himself to perform. Many students have been qualified for advancements or for positions in other lines of

work before they had finished even a third of their course.

The combination of this acquisition of a theoretical education with its practical application in the mill during the day has proved to be the most satisfactory method of giving a textile education. A student progresses rapidly or slowly as he wishes and completes his course of instruction at his own convenience without any extra payment beyond the first amount agreed upon. This amount is a fixed and moderate sum, payable either as a cash payment or in instalments and covers all expense necessary.

In addition to the printed lectures or instruction papers provided, the schools have prepared a library of textile information at an expense of between $60,000 and $70,000, which is supplied to a student for reference at the commencement of his course of instruction without extra charge, and which may be described, without fear of contradiction, as the most complete encyclopedia of textile information ever published.

Perhaps one of the strongest proofs of the esteem in which this institution is held by practical and thinking men is the fact that no less than fifty-eight members of this Association are now, or have been enrolled as correspondence students in the Textile Department of the International Correspondence Schools.

The influence of a correspondence education is also felt in the up-building of the character of a student. To undertake a regular course of study evening after evening, following upon a hard day's work in the mill, requires a development of determination and persistence, and the sacrifice of pleasure and habits that would bring no advancement. It develops a systematic method of approaching problems, and gives a mental training in system and routine that has a life-long effect. It probes a man's scope of knowledge of his own and allied trades. Without such instruction many a man would be limited to a knowledge of the department in which he works, but on the completion of a course of correspondence instruction, he has a knowledge of all the departments, and even of other branches of textile industry, which although in some cases he may never put into practice, must cause him to take a greater interest in the work of his own department, and be able to anticipate or trace many technical matters that would be otherwise impossible.

An important point for consideration is that this education is being given without any expense to the communities that are deriving the benefit from it. During the last ten years we have had over 1,500 correspondence textile students in Massachusetts alone. These men like all other correspondence students have appreciated their education sufficiently to be willing to pay for it at a price that approximately covers the cost, and many of them have stated that the education they have obtained is worth many times the money it cost to them.

One feature of correspondence textile education that is of practical interest to manufacturers is a system maintained for placing mills desiring skilled help in communication with worthy students who have graduated or made marked progress in their studies. This service is free both to the mill and to the student and many manufacturers have availed themselves of this opportunity of obtaining skilled men who not only have a theoretical, but also a practical training in the mill business.

I trust that seven years from now should it be my pleasure or that of someone else to address this Association on this subject, the same ratio of progress in textile education may have to be recorded. My personal opinion is that the opportunities of the last few years in providing for the young men of this country facilities for obtaining a textile technical education have developed with remarkable success and that the opportunities that are now open to them are wide and far reaching.

A number of gentlemen, including George O. Draper of Hopedale, George A. Ayer of Easthampton, and Wm. D. Hartshorne of Lawrence, Mass., commended the correspondence system of giving instruction.

At this session Mr. Simpson brought up a grievance in relation to an effort which he stated had been made through certain channels to induce Canadian overseers, and particularly those in his plant, to accept positions in the United States. He expressed the opinion that such measures were contrary to the statutes dealing with contract labor. Mr. J. A. Fernley of New Bedford replied and suggested that the association should not take any attitude that might be construed as a discouragement to healthy competition and the opportunity for employment under the most lucrative conditions. After some spirited discussion between these gentlemen the matter was dropped and the meeting adjourned.

No session was held in the afternoon, the members and their friends enjoying themselves in various ways, many of them taking excursions to the points of interest in the neighborhood.

At the second session on Wednesday evening the paper that was to be have been read by Harvie Jordan, President of the Southern Cotton Association, was read by George Otis Draper of Hopedale, and was very favorably received.

HANDLING AND MARKETING OF COTTON BY THE GROWERS.

HARVIE JORDAN, President Southern Cotton Association, Atlanta, Ga.

Mr. President and Gentlemen:—I beg to express to you my high appreciation of the cordial and voluntary invitation you have extended me to be present and deliver an address before your distinguished body on this occasion. The time has come in the evolution of cotton production and cotton manufacture when the growers of our great American staple and its spinners and manufacturers

should be brought into closer touch and business relationship. The growers and spinners of American cotton have too long been strangers. The intercourse between these two vital factors in the cotton industry of the world has been too long left in the hands of middlemen whose interests have been guided more from a personal selfish standpoint than for the upbuilding and betterment of the industry from the broad standpoint of industrial development.

The old adage, "Let well enough alone" applies only in cases where conditions cannot be bettered. We have reached that stage of our industry now where the law of economics must play an important part in the future of cotton production and manufacture. There are many matters of vital importance which mutally affect both the growers and spinners, and in the proper solution of these problems it is the part of wisdom and sound business policy that those two chief interests in the cotton industry of the world should cultivate a closer business relation and more friendly intercourse for the future.

It is particularly gratifying to know that the former chasm which so long separated and kept apart the growers and spinners was first bridged last May in the city of Washington, at the nation's capital, when a two days' convention was held between representative cotton growers of the South and representatives of the New England, Southern and European manufacturers. This convention was the first of the kind ever held in the history of cotton production. It was made notable because of the unusual harmony and good fellowship which prevailed from the opening to the close of the convention, and the intense interest manifested during the deliberations and discussions of all matters that were presented for discussion.

SOME MATTERS OF MUTUAL CONCERN.

For a long time the growers were led to believe that the spinners had no concern or special interest in their welfare so long as they produced a plentiful supply of the staple and sold it at low prices. It cannot be denied that in some quarters this charge was largely true, especially on the other side of the Atlantic. Foreign spinners, especially those of Great Britain, have partly explained their desire for cheap cotton as based upon the fact that their customers for the finished goods are largely among the millions of the poor populations of India and China. Foreign spinners, therefore, are particularly interested in urging the growers of American Cotton to the introduction of more expensive and economic methods of culture, to the end that a larger yield of the staple may be produced per acre at less cost to the grower so that profitable yet lower prices may exist. Mr. Macalister, of Manchester, particularly urged this point at the Washington conference last May, and while there is good, sound business reasoning in the proposition, and while considerable progress along that line is being made by the growers, yet the ever increasing cost of supplies, labor, taxable values of land and the social demands of a broader and higher type of civilization, make it extremely doubtful if cotton in the future can ever be profitably produced in sufficient quantities to meet the world's ever-increasing demands at prices less than ten to twelve cents per pound.

But aside from this one feature which may always constitute a ground for contention between the seller and the buyer, there are many other matters of paramount concern and of mutual interest to both the growers and spinners of American cotton. Among these matters of mutual interest may be safely recited the following:—Ginning, baling, covering or tare, country damage, damp in cotton, warehousage, marketing, speculation in futures and stable prices. The same circular saw which mutilated and tore the fibre in Whitney's early invention is still in use today. The same old unsightly, cumbersome bale, with the same partial covering of jute bagging and iron ties that were in use prior to 1860 is persistently adhered to even in the progressive era of the twentieth century. Our cotton today is more carelessly handled on the farms than it was thirty years ago when labor was more plentiful and farmers took more pride in sending their staple to market in first class condition. With some degree of mortification and regret I am forced to admit that farmers as a general rule show less consideration to the care of this valuable staple after it has been placed in marketable condition than any other product produced on their farms. This unpardonable neglect is due largely to the fact that the growers have not been impressed with the importance of handling this product more carefully until within quite recent years, or that better handling would net to them any better prices than cotton indifferently handled. In this connection, if the spinners would encourage the payment of an increased price to those growers who could be induced to place their staple upon the market in better spinnable condition, it would go a long ways toward bringing about quick reforms in this particular, but as a general rule the buyers of our cotton at interior points make a general deduction of so many points to cover probable losses that may accrue to them in the purchase of cotton badly handled and the grower who offers first class cotton has to suffer proportionately with his neighbors who may offer similar grades which have been subjected to country damage or inferior handling. It would be the part of wisdom and act as a superior inducement to offer a premium on all grades which are placed upon the markets in first class condition and the man who takes a pride in handling the cotton from his farm to the market should not be made to suffer in an arbitrary average reduction in prices simply because other growers are careless and indifferent. I am informed by leading cotton buyers that on country damage along an average reduction of twelve points, or one-eighth of a cent per pound is deducted and applied to the purchase of all cotton alike. The same arbitrary rule is applied to probable future loss in the weight of cotton by interior buyers. Under this rule an average reduction of five pounds on every bale is made in the prices offered the growers and applies with equal force to the bale that is sound and dry as well as to the bale which may have been carelessly stored and shows an excess of moisture. As these arbitrary reductions are deducted from prices offered, the average grower is ignorant of their existence. But you can readily see from instances of this kind that our buyers do not offer any superior inducement to the grower on the average bale of marketable cotton. The cotton buying world says to the growers in the fall. "Gather your cotton rap-

idly, even before the bolls are fully opened, gin it as fast as picked on machinery geared to the highest speed, and then rush it to market and receive the same uniform price on all grades with an average penalty for probable future reclamations charged against each alike." This is the system employed in the interior cotton trade of the South today. It has existed for years with but little improvement and the active co-operation of the spinners and manufacturers should be given to a speedy abatement of this evil.

GINNING AND BALING.

The first efforts toward decided reforms in the future handling and marketing of the South's great staple crop should be directed toward an improvement of the present system of ginning and baling. Our cotton should be ginned on roller gins which will separate the lint from the seed without cutting or napping the staple, something after the plan of the recently improved Fuller gin. From the gin the staple should be compressed in a high class power press and packed at sufficient density to enable its shipment direct to the consumers without recompression enroute as at present. The heavy cost of re-handling, the excessive freight rates, prohibitive insurance rates, difficulty in handling and the ease of damage from a number and variety of causes, make the present large loose bale of cotton as prepared at our gins a very costly item of unnecessary expense to both the growers and the spinners. If the spinners and manufacturers of American cotton are sincere in their expressed wishes to aid the growers and at the same time hold down the price of cotton to as reasonable figures as would be just and equitable to the growers, they should be prompt in assisting us to get rid of so many of the present unnecessary heavy items of expense which are put upon the staple from the time it leaves the gin house until it reaches the spinner's factory.

One great trouble in bringing about speedy reforms in ginning and baling is due to the fact that the present system of gins and compresses is under the control of modernized trust corporations. The present gin combine in the South would suffer if the demand for saw gins ceased and the roller process were supplied from other sources. There are $20,000,000 invested in large compresses which would cease to be valuable if the compression of cotton was done at local gins. These large moneyed interests are now and have been for years fighting any improvement in the methods of ginning or baling that would jeopardize their interests, and yet the burdens annually imposed upon both the growers and spinners by their continued existence amount to millions of unnecessary loss each year. Let us combine our interests for the express purpose of forcing needed reforms along this line and with the change to ginning staple that commands more value and the compression of a neat uniform package that will reduce to a minimum the cost of handling, storage, insurance and transportation, the farmers will become aroused to a higher appreciation of the true value of their staple as a marketable product and take a greater degree of pride in delivering it to the spinner in first class spinnable condition.

TARE ON COTTON.

From an economic standpoint, both to the producer and the spinner, it is desirable to reduce to a uniform and minimum weight the covering of cotton. While the cost of bagging and ties falls entirely upon the pockets of the growers under our present system of marketing, yet its weight enters into the question of freight as an item of expense in the cost of delivery which deserves the attention of the consumers. The matter of tare at the present time is very unjust to the growers. The American manufacturers have agreed to take their cotton upon an average reduction of twenty-two pounds to the bale, while an allowance of six per cent. is deducted from the gross weight of all cotton which goes to export. As the average weight of our cotton is a little over five hundred pounds per bale gross, it is evident that a deduction of at least thirty pounds per bale is made by the buyers on all cotton for export. This deduction is figured from the price offered to the farmers, as all prices in the interior are based on gross weights, and the same price is paid for cotton for domestic use as for foreign shipment. It is evident, therefore, that the growers, in applying only twenty-two pounds of bagging and ties to meet the requirements of domestic spinners, suffer an average reduction of thirty pounds to the bale and thereby sustain a net loss of practically eight pounds of lint cotton on every bale placed upon the market. As sixty-five per cent. of our cotton is shipped abroad, and as there is no difference in the prices offered for domestic or foreign shipment, the Liverpool requirements control the market. This is a matter which needs adjustment in order that a fair and just deduction for tare may be agreed upon, and the tare regulated on as light a basis of weight as will protect the staple and get it to the spinner in good condition. I would therefore urge your co-operation along this line, and if our cotton can be successfully compressed at the gin, we can deliver a neat package of uniform density and size with a minimum weight of tare which should apply to all bales alike, regardless of their weight.

STORAGE OF COTTON IN WAREHOUSES.

Pursuant to the organization of the Southern Cotton Association, there had been no direct concert of action relative to the building and equipment of adequate cotton warehouses for the purposes of storage and marketing the cotton crop by the growers. During the past two years, however, under the wide agitation and discussion of this important matter and its imperative need in the future handling of the South's staple crop, great progress has been made. Several hundred modern, up-to-date warehouses have been constructed at different interior markets points in the cotton states during the past eighteen months, and many hundred more are now in the course of construction or in contemplation of building. These local warehouses are being erected by local capital, subscribed by farmers, bankers, merchants and others, with a varying capacity of from 2,000 to 50,000 bales, according to the requirements of the various localities. As a general rule, they are built according to the plans and specifications of the fire insurance companies, in order to give first class storage and reduce the present high rates of insurance to a minimum of expense. Our Association has conducted an active campaign of education along this line and assisted in this needed reform in the cotton industry in every way possible, with splendid results up to the present time, and

continued bright prospects ahead. With the establishment of modern warehouses facilities throughout the interior of the cotton belt, practically all of the present difficulties which confront the growers in properly and intelligently marketing the crop to meet the demands of the spinners and minimize the growing and disastrous evils of speculation in cotton futures to the detriment of the legitimate cotton trade will be overcome. Aside from this, the heavy annual losses to both the growers and spinners from country damage and damp in cotton will be obliterated. With cotton warehouses built at every interior market point, the growers will soon begin their patronage and the staple will be promptly delivered from the gin to these first class storage facilities and there held in perfectly dry and good condition until sold and delivered to the transportation companies for shipment to the factory.

Furthermore, these warehouses will be placed in charge of competent, expert cotton men, who will grade the cotton and properly weigh it. A negotiable receipt will be issued with the grades and weights guaranteed and underwritten in such a way as to make these receipts negotiable in any financial centre. Such a cotton warehouse receipt, where the staple is properly stored and insured, will present a high type of gilt edge security—to our banks and will at once command very cheap money. This system will enable the growers to borrow money as needed on their cotton in storage to meet maturing obligations in the fall and winter, while it will further induce and enable the growers to sell the crop slowly and break up the present disastrous system of rushing the staple on the market during a short period of time when it is not needed for consumption.

This system will do more. It will ultimately enable the growers to get into cleaner touch and into more direct business relations with the spinners. With their cotton stored in warehouses, the staple graded and weighed, backed by a strong financial system and the introduction of first class business methods in the sale of the crop, they can begin to organize a system for taking orders direct from the spinners and be in position to execute these orders promptly and efficiently. This would be an ideal consummation of the future cotton trade of this country and I feel assured that from expressions already made by many of our leading spinners that they would enter heartily into an arrangement of that kind.

We ask your co-operation along all these lines, believing that such co-operation will hasten the day of the emancipation of both the spinners and the growers from the dominating influences of both the middlemen who buy our cotton for you and that extreme element of speculation which has in the past and is at the present time so hazardous to the legitimate interests of the cotton trade.

STABLE PRICES.

With a better understanding between the growers and spinners, with improved facilities for handling and marketing the cotton crop in the future the foundation can be permanently laid for the fixing and maintenance for a fair stable price for the staple which will be mutually profitable to both interests. I wish it distinctly understood that the great Association which I have the honor to officially represent as its official head, has no desire to undertake to force the payment of such a high price for cotton as that it would curtail consumption or prevent the spinners and manufacturers from earning a fair and equitable dividend upon the investments which they have made in the great and useful industry they pursue. Our people are being taught to regard the spinners of the world as their best friends instead of their enemies as they were taught to in years gone by. We realize that unless the spinners prosper our industry must suffer, and we ask the same degree of consideration at your hands. If we knew each year at what price you could profitably spin our cotton, we could more intelligently agree upon a price that would be more satisfactory and upon which our present differences could be more quickly harmonized. The South at the present time cannot produce abundant supplies of raw cotton at a living profit for less than ten cents and if prices for any reason prevail below that figure, production will be necessarily curtailed and the spinning industry made to suffer from the reaction. The cotton growers of the South are not compelled to grow cotton at a loss for their future existence, but the cotton mills of the world must be kept busy with their spindles and looms constantly employed, in order to make their investments profitable. I am thus plain in my statements along this line because there is a constant and ever increasing effort to depress the price of our cotton down to or below the cost of production. With your interests so vitally affected in the future, and being, as you must be, so closely related to and with the growers in the cotton industry, we ask you in all candor and in all earnestness to join with us to maintain the price of the staple at fair and profitable figures to the growers in order that your industry may not be jeopardized and that the growers may have every inducement to push forward to wider and greater efforts in production so as to safely meet the ever expanding and increasing demand for American cotton.

We wish the highest measure of prosperity, not only to you and the capital invested in the cotton mills of this country, but also to that vast army of wage earners who make the success of your mills possible. We ask for the millions of cotton growers in the South, the same measure of prosperity in the life work in which they are engaged. We realize that we possess a distinct monopoly in the world's production of cotton and have but few fears that the rights of this monopoly will ever be infringed upon from any other quarter of the globe. We would rejoice if the American manufacturers occupied the same strong position as that of the growers. The South is now financially able to protect the cotton crop from any future imposition of very low prices and the farmers will successfully resist any effort made to reduce prices below the cost of production, or even below a price that will at least net to them a profit.

With but one thought single to the future glory of our American union, actuated by that sentiment which would tend to build up and make prosperous all sections of our country alike, let us join hands for the prompt and effective solution of those problems which so vitally affect this great industry of mutual concern and enjoy those benefits that should and must accrue to every interest legitimately concerned in the great staple crop of the world.

Next came a paper by John Martin of Texas, who outlined the plans of the Farmers' Union to bring spinners and planters together in making direct sales of cotton. The sentiment of the meeting in favor of this plan was very emphatically expressed by Stephen A. Knight and J. R. Montgomery. The following very valuable paper on Egyptian Cotton was then read by Arthur A. Haserick of Boston.

EGYPTIAN COTTON.

ARTHUR A. HASERICK, Boston, Mass.

It seems but a short time ago that Egyptian cotton was to most American spinners a comparatively unknown article. The peculiarity of the various growths, the planting of the crop, the ginning and baling were all matters to which American spinners as a whole gave but little of their attention. Today, however, the situation has entirely changed and Egyptian cotton may be said to occupy here very much the same position as it does in England, and users have become quite familiar with the various growths which that country produces.

Much has been written on the subject in American textile papers, and only recently a very able address by S. H. Carver, of Alexandria, was delivered before the American Cotton Manufacturers' Association at Asheville, N. C., which in a few words gave a great deal of valuable information regarding the manner of handling this product of Egypt. Anyone at all familiar with the subject, particularly if he has visited Egypt, cannot fail in being impressed with the method and system employed throughout and this is particularly noticeable when compared with the usual custom of American cotton growers. It is not going too far to say that Egyptian cotton would not have found in the United States such a ready market had domestic growers been less lax in their methods. It has often been suggested that Egyptian cotton could be grown in the United States and in point of fact a few enthusiasts with the assistance of the Agricultural Department have planted the seed. The results obtained, however, had very little resemblance to the real thing and whatever resemblance may have existed was to a large extent destroyed by the poor ginning and handling. The success of the Egyptian cotton industry may be explained by the one word, thoroughness. England has done much for Egypt and not the least of her achievements are to the improvement of the remarkable irrigation system, upon which everything depends and the business-like methods established for the growing and trading in cotton. In Egypt we have a system which is complete. The sowing, picking, ginning, baling and shipping are all matters which have been studied with a view of arriving at perfection. Mistakes, of course, are bound to occur but they are comparatively rare and it must be borne in mind that many of the growers and head men are Arabs, who, as is well known, consider what we would term dishonest trading to be a perfectly legitimate thing, but there are provisions to guard against this, it is a part of the system, with the result that any dishonesty when detected is a very serious matter for the parties involved.

When the new crop is ready to come to market, the Alexandra General Produce Association determines upon a type out of the crop to be considered as "fully good fair," the basis for all transactions. The sample selected is divided, one portion being placed under glass in the rooms of the Association, which on no account must be taken out until the following year. Another portion is left open to inspection under special conditions. In the event of any dispute arising between the buyer and seller these samples may be referred to, and if an amicable arrangement cannot be arrived at the matter comes up before the Board who give their decision, which is final. In case of any trickery on the part of the seller the conditions imposed are such that make it difficult for him to continue business.

A feature about Egyptian cotton is the uniformity of quality. This may be explained by following the system throughout from the beginning. In the first place large ginning factories have been erected at the important centers, being owned chiefly by different large shippers. The cotton is bought by these establishments in the seed from the surrounding districts and when a sufficiently large quantity of it has been secured, it is inspected in the factory yard and is there graded preparatory to ginning. Some of these factories it may be pointed out have a production equivalent to about 300 Egyptian bales per day. The gins are generally arranged in two rows, feeding inwards. When a batch of cotton is ready for ginning it is fed into all of them simultaneously and delivered on to trucks running on a railway between two lines of gins. It will be observed that the whole of this cotton, after being graded before ginning, which is important, receives a most thorough mixing by the manner in which it is delivered from the gins. From here it is taken to a press and put up in bales weighing approximately 800 pounds, but which are about twice the size of the regular shipping bales such as are received over here. These large, or country bales as they are termed, are brought to Alexandria by means of canal and here they are again examined, graded and classified. When a lot of several hundred has been made up, all of them are entirely opened and given a thorough mixing in the large apartments intended for that purpose in the buildings of the Egyptian Pressing Co. The cotton is then ready for the final pressing. The number of bales resulting from this operation varies, but it generally consists of several hundred. The machines for the final pressing are rather formidable, being a combination of steam and hydraulic power; each is fitted with three bins, two of which are being filled with the loose cotton, while the third is under pressure. They are arranged to revolve so as to come under the press as required. Before the cotton is placed in the bin the covering is inserted, steam is then applied to the machine and when this has reached its extreme limit eleven hoops are put on. A further pressure is then applied by hydraulic force, and this enables the attendants to buckle the hoops. The bales expand as the pressure is released, making the hoops absolutely tight. In this condition they are thrown down a shute and with the exception of the ends, which have yet to be sewn on, they

are ready for shipment. The capacity of a press of this description, running under favorable circumstances, is from fifty to sixty finished bales per hour. A good quality of burlap of uniform weight is used for covering purposes so that the tare seldom varies from the fixed standard of twenty-two pounds.

While it is admitted that the cost of baling is greater than that adopted in America, on the other hand there is a large saving in the matter of freight. (Ships that can pack 10,000 or 12,000 bales of Egyptian cotton can only take from 6,000 to 8,000 bales of American cotton, although, according to the ratio of weights, they should take 14,000.) There is practically no loss or damage to the cotton in transit and the insurance is naturally less, on account of the limited risk of cotton packed in this manner.

It is difficult to see, having in mind the well known American enterprise, why some such system cannot be applied to cotton delivered from the South. The cost of installing a pressing plant, such as is used in Alexandria, is, of course, considerable. On the other hand, were this system adopted here there would be a distinct advantage, and if care were taken in grading and mixing the bales before packing, it is possible that a premium on the cotton thus handled could be obtained. It would be an advantage to the mills to know that one sample taken out of a bale would fairly represent the lot, as is the case with Egyptian cotton.

The dam recently constructed at Assouan has done much to increase the water supply and prevent drought. This, however, is not sufficient for Egypt's requirements, and further extensive works are now contemplated. When these are constructed it will mean that in the course of time a larger cotton acreage may be looked for. As a result of the Assouan dam the area under cotton in Upper Egypt, that is to say, the country south of Cairo, has already increased, and the cultivation is now extending into the Soudan, which is producing to a limited extent some very desirable cotton which in the course of time will improve. Ten years ago the crop of Upper Egypt was approximately 250,000 cantars. Now it is 1,000,000 cantars and it may increase, perhaps, at least half as much again when the irrigation scheme is completed. The effect of the dam upon Lower Egypt is proportionately less as regards the extension of growth, but it has secured a better water supply for the crops during the spring and early summer months, and some waste lands are now being washed and reclaimed.

A few years ago it was customary to plant cotton on the Delta lands once every three years, the other years being used for a rotation of crops generally ending with birseem, which gives back to the land that which the cotton plant had removed for it is well known that cotton weakens the soil. At that time no fertilizers were used, but of late years it has been customary in some districts to fertilize the land before sowing, in which case it was not necessary to rotate the crops as formerly, so that in this way the area under cotton has increased and the planters have availed themselves of every opportunity of meeting the increased demand. On the other hand the production per acre of lint cotton has shown a marked falling off. In 1905 the average yield per feddan, which is equivalent to 1 1/10 acre, was about 395 pounds. In Mr. Carver's paper he states—"It is a regrettable fact, and one that calls for reflection, that this yield compares very unfavorably with former years. The cotton crop in Lower Egypt in the year 1897 was in quantity 15 per cent. more than in 1904 and 1905, while it is but a moderate estimate to put the area under cotton in these last years, to be 20 per cent. larger than in 1897, thus the total comparative deficiency of yield is fully 35 per cent."

The tendency has also been toward planting cotton closer together in order to obtain more plants per acre. This, however, had been found detrimental to good results. The problem now is to find a way of increasing the crop to meet the demands and at the same time keep up the quality.

Attention is now being directed to the Soudan, but the development will be a long matter as a large irrigation scheme is required. The government has rightly decided that nothing must be done in the Soudan which shall prejudice the supply of water required for Egypt. This means that a quite insignificant quantity of water may be drawn from the Nile after January 31st of each year, in order that the bulk of the supply may come down to fill the Assouan reservoir and give the early summer supply for Egypt. The Irrigation Service has calculated the quantity of water that may be spared, and has granted rights for pumping onto a few thousand feddans. Beyond this no pump may work after January until the new water comes in the summer. This naturally is a considerable hindrance to cultivation. The remedy will come when a scheme for holding up water in the Soudan has been planted and executed, which is a matter of extreme magnitude.

In closing, a few words may not be out of place respecting the effect of the dam at Assouan. It will be remembered that this great engineering work was completed in the year 1902, and the crop of the following year was the first to be benefited. It was constructed chiefly with the view of protecting the land under cultivation, and while it was not expected that there would be any material increase in Lower Egypt, it was recognized that the land of Upper Egypt would be chiefly benefited. This of course refers to a narrow strip about 600 miles long and a few miles wide, but the soil is rich, and with a regular supply of water crops could be depended on. Beyond this strip and this applies to all land which cannot be reached by the Nile water, there is nothing but a sandy desert impossible for cultivation. The following table will show the land under cotton during during the past few years:

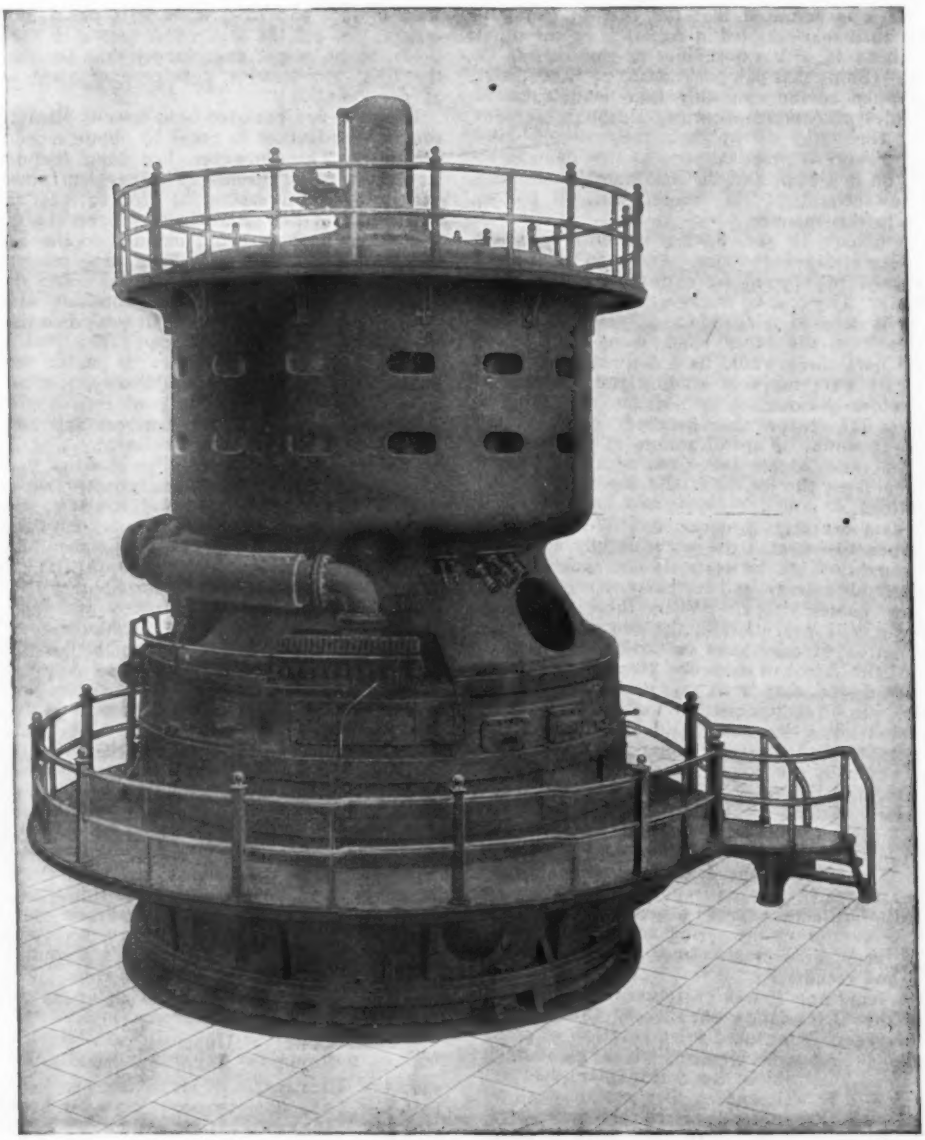
	Lower Egypt.	Upper Egypt.	Total.	
1902-3	1,125,476	83,341	1,209,017	Feddans.
1903-4	1,134,380	156,000	1,290,380	Feddans.
1904-5	1,162,519	243,409	1,405,928	Feddans.
1905-6	1,213,988	328,600	1,542,588	Feddans.

From this table it will be seen that the acreage of the Delta has increased, but not to such a marked extent as is shown in Upper Egypt. On the other hand, as already pointed out, the production of cotton per acre has been reduced. The following is a list of the crops for the same period:

1902-3	5,838,000 cantars.
1903-4	6,509,000 cantars.
1904-5	6,352,000 cantars.
1905-6	5,900,000 cantars (estimated).

It is, therefore, apparent that the increased area has not been followed by a proportionate increase in crops. To go still further back—the crop of 1897-8 was 6,543,000 cantars, that of 1899 and 1900 only a little less, and neither of these had the benefit of the dam. Every effort is now being exerted to increase the supply in order to meet the demands, but it is quite evident that for some time to come the requirements can only be met with difficulty.

The third session on Thursday morning opened with a paper on the Curtis Vertical Turbine.



THE CURTIS STEAM TURBINE.

THE CURTIS VERTICAL STEAM TURBINE.

CHAS. B. BURLEIGH, Boston, Mass.

It is the object of this paper to present for your consideration some of the results which it is possible to produce by the use of the Curtis steam

turbine, avoiding, as far as possible, any comparison with reciprocating engines or turbines manufactured by other concerns, leaving this matter of comparison to your own further investigation as to whether or no they are capable of similar results.

DEVELOPMENT.

In the design of the Curtis turbine, rugged construction was first sought and efficiency made dependent on rugged design. The Curtis turbine is an impulse or action turbine of the Branca type, that is to say, the wheel or wheels are actuated by steam expanded in passing through a nozzle or nozzles, which, acquiring velocity by expansion is brought in contact with suitable buckets or vanes secured to the periphery of a wheel or wheels. The contact between the steam and the buckets results in the steam giving up a part or all of its velocity to the buckets thus actuating the wheel which being secured to the shaft causes it to rotate at a speed dependent on the action of the steam and the radius of the circle through which the bucket moves.

SCREEN.

A screen is provided in the main supply pipe, to prevent the possibility of scale or other foreign matter from entering the turbine.

EMERGENCY STOP.

This consists of a steel ring, surrounding the shaft just under the middle steady bearing, heavier on one side, and held concentric to the shaft by an adjustable spring on the opposite side, which can be so adjusted that at any predetermined speed above the normal, the weight of the ring will overcome the tension of the spring, due to centrifugal force, and becoming eccentric to the shaft, strike a trip wing which springs a catch supporting a weight. This weight, raised by a chain and held aloft over the main throttle valve, is set so that the instant the catch is sprung, the weight falls on a pair of toggle joints, releasing the throttle valve, forcibly shutting it and thus stopping admission of steam to the turbine; the catch may also be sprung by hand.

GOVERNOR.

The governor is of the spring loaded fly-ball type, actuated by the main shaft of which it is a part, being an extension of the same and necessarily operating at the same speed, without the introduction of intermediaries. The movement of this governor actuates the device controlling the valves admitting the steam to the turbine. On the governor hood of such machines as make its use desirable, is located a small motor enabling the operator to control the tension of the governor spring from the switch-board, thereby enabling him easily to adjust the speed of the turbine for the purpose of synchronizing it with other machines.

ADMISSION VALVES.

Steam is admitted to the turbine proper by a series of valves, varying in number in accordance with the capacity of the machine.

These valves are arranged to open successively and are of such number and size that with two-thirds of the valves open the turbine will operate at full load.

The action of these valves is such, that all working valves are fully open and all idle valves are tightly closed with one exception which will be explained later. This obviates the possibility of any steam throttling, or steam hammer liable to cause undue stress on the piping or boilers. The operation of these admission valves is controlled by the governor by three different methods.

ELECTRICAL CONTROL.

A suitable rod from the governor rotates a cylinder on which are located contacts corresponding in number to the number of admission valves to be operated. These contacts are so located on the cylinder as to engage successively. Each contact is electrically connected with a solenoid operated by approximately one-half ampere of current, delivered from the exciter or other convenient source.

Each solenoid operates a small pilot valve, each of which actuates a main admission valve. These main admission valves are a simple form of poppet valve actuated by unbalanced steam pressure regulated by the pilot valves.

MECHANICAL CONTROL.

A gear is located on the main shaft which engages with a suitable pinion secured to an auxiliary shaft, and which by the aid of a suitable crank delivers reciprocating motion to a series of dogs or latches which engage successively a series of cams, whose relation to the latches is determined by a rod connected to the governor arm, which mechanism successively operates the admission valves.

By this method the valves are mechanically opened and closed.

HYDRAULIC CONTROL.

With this control, a rod rigging connects the governor and the piston rod of a hydraulic cylinder. One link in the rigging is a horizontal cross-arm supported at one end by the rod rigging on the governor side, and at the other end by a connecting rod from the piston, while at the centre of the cross-arm the stem of a small controlling valve is trunnioned.

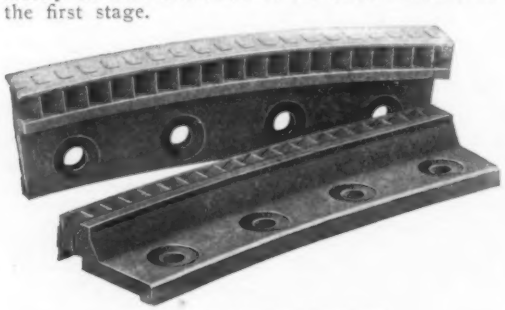
This valve is operated by the governor and controls the admission of oil to the hydraulic cylinder, while a differential action supplied to the cross-arm (referred to above) by the piston rod, allows the controlling valve to operate across its central position for any position of the governor (and therefore for all speed and load conditions) so that the main operating piston, and thus the number of open valves, will be fixed for any given speed of the turbine.

EXPANDING NOZZLES.

The first stage expanding nozzles which deliver the steam to the first stage buckets are of a number corresponding to the number of admission valves, each nozzle being controlled by its individual valve. They are of such dimensions that the steam will expand from gauge pressure to the predetermined pressure necessary to give to the steam the desired velocity, and of such shape and pitch

as will deliver the steam directly into the buckets without any abrupt change in direction and without shock, in other words, at an angle corresponding closely to the arc of the buckets. As has already been explained these nozzles become active successively and their delivery ends are brought so closely together that the admitted steam is delivered to the buckets in an unbroken continuous belt of a length proportionate to the load on the turbine and of a width corresponding to the length of the buckets.

It is obvious that regulation is accomplished by lengthening or shortening this belt of admitted steam, which, under full load conditions approximately encircle one-sixth of the circumference of the first stage.



THE CURTIS TURBINE BUCKETS.

After the steam has given up its velocity to the first stage buckets it is by them delivered to a row of nozzles, in which it expands to the second stage pressure, similar to the first stage nozzles except that they are uncontrolled and prepared at all times to expand all the steam delivered to them by the first stage wheels. They are larger and there are more of them extending around approximately one-third of the circumference, for the reason that the partially expanded steam now occupies more area.

The second stage wheels deliver the steam to a third line of expanding nozzles, still larger and extending around approximately one-half the circumference, which expands it to a third stage pressure and the third stage wheels deliver it to the fourth stage nozzles, which are still larger in size and which encircle almost the entire circumference due to the increased area occupied by the steam due to its expansion.

It will be noted that from the point of delivery by the first stage nozzles the flow of the steam through the turbine is continuous, thus causing no undue stress on any of its parts, that there are no sudden and frequent temperature changes to result in thermal losses.

I would also call particular attention to the fact that these expanding nozzles are in no way adjustable and that the resulting expansion is fixed, that their efficiency is dependent wholly on design and in no way dependent on adjustment.

BUCKETS.

The buckets are cut by special machinery, in some cases from the periphery of the wheel of steel casting, in others in the outer circumference of a ring of steel casting, the outer diameter of which corresponds to the diameter of the wheel to which it is ultimately to be secured and for use in the turbines of larger capacity the buckets are milled from sections of cast bronze some two feet long and containing, when completed, according to the dimensions of the buckets, from 15 to 24 buckets each.

The following diagram will enable me to call to your notice more clearly some of the characteristics in connection with the shape of buckets.

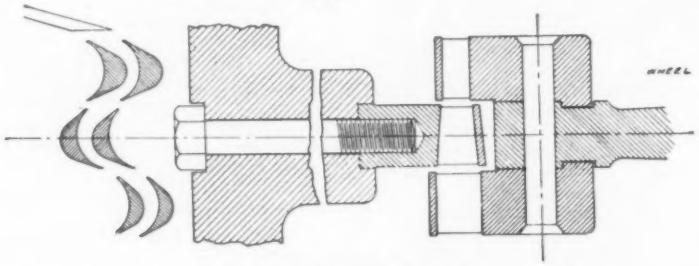
At the upper left hand corner is represented the expanding nozzle delivering the steam to the buckets and expanding it from gauge pressure enables the steam to acquire the desired velocity.

It will be noticed that the angle of delivery corresponds closely to the arc of the buckets which the steam will easily enter without shock, excessive friction, or sharp angular deflection.

On leaving the nozzle the steam is delivered into the space between the first row of moving buckets which are constructed in sections and firmly riveted to the upper side of the supporting wheel.

On entering this first row of moving buckets, part of the velocity of the steam is transferred to them and by their curvature the direction of the flow of the steam is changed and is by them delivered to the row of stationary re-directing buckets termed "intermediates," where its direction is again changed without shock and also, as previously explained, without diminution of velocity or energy and is by them delivered to the second row of moving buckets similar to the first, to which the balance of the velocity of the steam is imparted.

This second row of moving buckets is riveted to the under side of the same wheel to the topside of which the first row of moving buckets is secured.



A SECTION THROUGH A BUCKET.

This method gives the same effect as using two wheels and is much to be preferred.

I will here call your attention to one or two features which may be of interest.

You will notice that the path provided for the steam is a gradual curve, presenting no sharp or sudden changes of direction.

That its path gradually increases in area as the velocity is being abstracted during its travel.

You will notice that the distance between the centre of the buckets is less than between tips, the reason for this being that with steam traveling at a high velocity, on making the turn at the bucket centre, there is a compression of the steam which if this area were equal at all points would result in effecting a partial vacuum on the front centre of the bucket.

Eddy currents would develop in the steam and a portion would change its direction of flow and be drawn into this vacuum, run back into the incoming jet, thus impairing the efficiency.

For this reason, while the expansion of the steam is in no way dependent on the area between buckets, for which reason, inequalities at this point are of less vital importance than in some turbines, it is still a matter worthy of very careful design to proportion this area exactly in accordance with the compression and still not contract the area to the extent of introducing friction which would be so objectionable.

The short, sturdy bucket design with all buckets positively secured at all points preventing the remotest possibility for the buckets changing position with relation to each other, is one of the strongest factors of its success. And here again is brought prominently to our notice that these conditions are wholly a matter of design and the results are in no way dependent on adjustment.

It will be noticed that the angle of entrance and angle of departure of the steam to and from all buckets is equal or, in other words, the position of all buckets is symmetrical with respect to the axis of rotation, hence there is absolutely no end thrust or torsional strain on any of the buckets.

It will also be noted from the diagram that the finished bucket being less in width than the material from which it is formed and the shrouding being of a width equal to the bucket material, absolutely prohibits the buckets from coming in contact with anything other than the actuating medium, under any condition of operation.

This may, perhaps, be more strongly emphasized by the fact that in all the Curtis turbines in operation, there has never been a bucket injured, except by solid foreign matter which has entered with the steam.

In the bucket construction more than anywhere else is evidenced the fact that the high efficiency is dependent on rugged design, for while the bucket which transmits the energy is the smallest member and in the Curtis turbine it is the most sturdily contructed part and the one most thoroughly protected.

WHEELS.

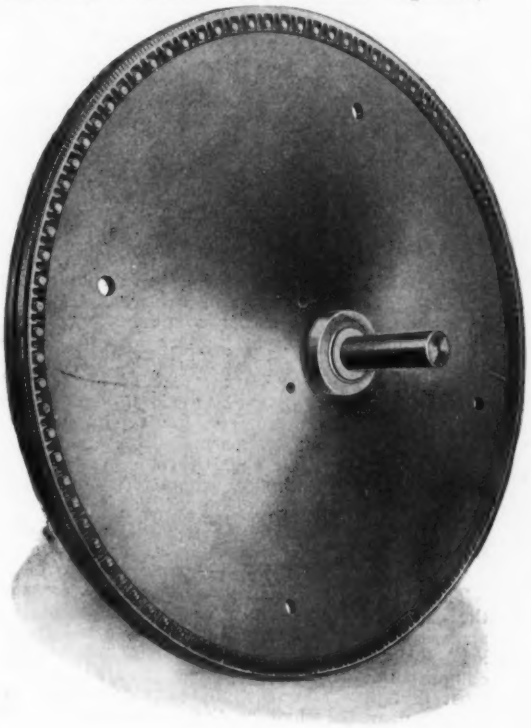
The wheels designed to support the moving buckets in their proper position and transfer the energy received by them to the shaft, are formed from solid steel castings of such dimensions as will insure their rigidity under all conditions of load. They are securely keyed to the shaft at the hub which is of a length corresponding to the length of the stage in which it operates. From the hub the wheel gradually tapers to its periphery, where its thickness is according to the capacity of the turbine in which it is used from 1 inch to 1 1/2 inches.

The diameter being such as may be determined by the shaft and bucket speed.

There is one of these wheels for supporting the two rows of moving buckets in each stage of the turbine.

A channel is turned on each side of the wheel approximately 2 inches from its periphery.

By reference to diagram No. 4, it will be noted that this channel is for the reception of a corresponding shoulder on the bucket segments,



A REVOLVING WHEEL FOR CURTIS STEAM TURBINE.

which are securely riveted to each side of the wheel through suitable holes drilled in the wheel for the purpose. This channel and shoulder take care of all centrifugal strains so that the only province of the rivets is to support the weight of the bucket segment.

PACKED JOINTS.

The Curtis turbine has but one packed joint in the entire structure. This is located below the middle—steady bearing at the top of the steam unit, where the shaft passes through the end of the first stage. The packing consists of three graphite rings encircling the shaft; between these

rings steam is admitted at boiler pressure, and discharged into one of the later stages where its energy is utilized.

The ability to simplify the packing conditions was another strong incentive for the adoption of the vertical design, which results in making it possible to support the shaft at but one point (the bottom) leaving it absolutely free to expand upward without any possibility for pinching.

THE GENERATOR.

Many people, without carefully considering the matter, fail to appreciate the conditions which make practically prohibitive the application of the mechanical output of the steam turbine other than through the agency of the electrical generator.

Let us open the consideration of this phase of the subject with a full understanding of the fact that the Curtis turbine operates at a rotative speed of one-half that of any other turbine on the market in this country and is, therefore, that much better adapted for mechanical operation.

Alternating current generators are almost universally employed for this purpose as the rotative speed of the turbine is so high as to result in a peripheral speed of the commutator which makes its use prohibitive with any other type of turbine except the Curtis, for which reason the Curtis is the only turbine with which is supplied a direct current generator directly connected to and operating at the same speed as the turbine shaft, the alternating current generator being more flexible in its adaptation, its use predominates.

The generator designed for use with the Curtis turbine operates at a speed which not only allows of successful commutation but presents almost perfect characteristics of generator design for either direct or alternating current, to the end that the generators designed by the manufacturers for use in connection with the Curtis turbine present both mechanical and electrical characteristics, which are unsurpassed by any line of generators ever offered for commercial service by any manufacturer.

ROTOR.

The general scheme of ventilation is to arrange the air circulation so that the movement of the air will be definite, and will not consist in "churning" the same air over and over. In order to accomplish this definite movement, the air is for the most part drawn in through openings at the top and as near the shaft as the guide bearing will permit.

The stationary part of the alternating current machines is the armature and, consequently, is that part built up of laminations where the hysteretic losses and, consequently, by this laminated structure or core, is the seat of the generation of heat.

It is built up in sections for the passage of air as it is forced out by the rotating part. The "head" or pressure to the moving air is given by the centrifugal force of the rotor.

The air is drawn into the rotor between the arms of the spider and close to the shaft and is forced out through openings in the rim. Two types of rotor are now being built, one with "definite poles" and one with construction designated as "smooth core."

The "definite pole" type of construction is employed where the number of poles is eight or more. The "smooth core" is admirably adapted for two and four pole machines.

The "definite pole" type involves greater simplicity in the matter of field coils, there being but one coil per pole. This coil is machine wound and is rectangular.

The turns of the winding are insulated from one another and thoroughly cemented together, so that the finished coil is a solid mechanical structure.

The end projecting beyond the pole at the top and the two ends of the machine is supported against centrifugal strains either by means of strong steel straps attached to the rim underneath, or by means of strong pins above the coils passing across from the pole to a disc built up of laminations and assembled as part of the rim but outside of the ends of the field coils.

The laminated rims of some of the "definite pole" machines are built up in such a manner that simply one-half of the rim between the poles is solid.

This results in a large cross section area of air ducts. The rims of machines whose poles are relatively short in the direction parallel to the axis of rotation, do not require passage for air through the rim.

The revolving fields that involve a small number of poles are of the "smooth core" type, with two or more field coils per pole. Some of the smaller sizes of four pole machines have these coils in parallel slots. The larger sizes of four pole machines, as well as all two pole, have the coils in radial slots.

The coils in parallel slots are wound on machines and in their shape are the same as the coils of the "definite pole" machines.

The method of assembling is similar except it is not necessary to remove any of the iron part of the rotor other than the supporting discs at the two heads and the wedges in the slots.

Nearly all "smooth core" rotors are axially constructed of definite sections with large passageways for air between the several sections.

The coils at the heads of the machine are in most designs ventilated by passageways for the air between the coils.

They are supported against centrifugal force by steel rings assembled over them and held in place by means of discs bolted to the rotor spiders or attached by means of a nut threaded to the shaft or hub of the spider.

STATOR.

The stator is what is known as the "open type" of frame construction which frame consists of a ring at each end connected by cross bars or "pillars."

The laminations of the stator core are held in place by keys that are dovetailed into these pillars.

In this machine the laminated core with the ventilating ducts and spacing blocks between sections are visible to the eye.

The air has perfect freedom in passing out into the room, while the entire outer periphery of the core where the hysteric losses originate, is exposed to the currents of air external to the machine.

The cored out holes in the ring at top and bot-

tom serve as ventilators behind the armature winding.

RATING.

The Curtis turbine is rated in units of energy, in accordance with its available commercial output, which with a turbine (as previously explained) is and must be electricity.

The standard unit of measurement of electrical energy is the watt and one thousand watts is a kilowatt.

The medium of operation is steam and the standard unit of measurement of steam is weight or pounds per hour.

It is impossible to get an indicator card or diagram of any steam turbine, the only equitable measure of work done by a steam turbine is the ratio which the commercial output bears to the commercial input.

The commercial input is steam easily measured and the commercial output is electricity also easily measured.

The Curtis turbine is, therefore, rated in kilowatt output and all guarantees made dependent on the number of pounds of steam necessary to deliver a kilowatt on the switchboard. This method eliminates all heat, steam, friction, windage, magnetic and electrical losses, in fact all losses of every name and nature pertinent to the entire unit.

We have now pretty thoroughly described the details of the construction; let us now discuss a few of the details of operation.

STARTING.

The conditions existing in the turbine are such as call for the exercise of no excessive care in starting, as no serious trouble will develop from the admission of high pressure steam with as little delay as is permissible to insure the piping supplying the steam to the machine. Water admitted to the turbine has no more effect on it than to cause diminution of speed, for the reason that the speed of water is less than that of steam.

There being no chance for compression in this turbine, there is no reason why, if water were delivered to it and in suitable quantity at sufficient pressure it would not run it without injurious effect.

CLEARANCES.

As has been previously stated when the Curtis turbine is in operation under full load conditions, there is no part of the machine on which the load is dependent in which moving metal is in contact with stationary metal.

In fact, the only parts of the machine in which moving metal does touch stationary metal are the small governor parts and the valve stems of light weight and where the movement is small and infrequent. The clearances between the stationary and the moving blades of the Curtis turbine are from 1/8 to 1/2 inches, but this is not the limiting feature, as previously explained, the width of the buckets is less than the material from which they are formed and the bands at the ends of the buckets are of the same width as this material.

The clearances between these flat smooth surfaces are from .06 to .70 of an inch.

The clearance between the ends of the buckets and the casing is from two to four inches according to the size of the turbine.

But, you may ask, what confines the steam to its desired path? The pressure in the stage is approximately that of the steam admitted, for which reason the steam has no tendency to change its direction of flow unless it meets an obstruction which would tend to interfere with it, and a much easier path is provided through the buckets than for it to turn sharply at right angles and leak through the clearances into a medium of its own density.

In fact, clearances between buckets of any turbine is of minor importance as far as efficiency is concerned, the principal reason for keeping them as small as good engineering will permit is to reduce the shaft length to a minimum on account of the shaft expansion.

The Curtis turbine differs, however, from most of the other turbines in that the radical clearance or the clearance between the ends of the buckets and the shell, upon which they are dependent for high efficiency are absolutely of no importance in the Curtis type.

In fact, if steam did pass through any of the earlier stages of a Curtis turbine without engaging the buckets it would still possess the kinetic energy given it by expansion and would be obliged to give it up to the buckets in the next stage.

WEAR.

From the fact as previously explained, that in no part of the machine moving metal is in contact with stationary metal, wear from metallic friction cannot occur and the only other source from which wear could develop would be from steam friction.

While one might expect more or less wear from steam moving at a high rate of speed, when brought in contact with the metal moving at a different speed, really this is not the case, as evidenced by the fact that of over four hundred turbines in use, many of which have been in use for two years or more, no wear has been discovered.

AUXILIARIES.

Many people have gained an idea that the auxiliaries necessary with a turbine are greater in number and require more care than with other types of prime-movers.

No more auxiliary apparatus is necessary with a vertical shaft Curtis turbine than with any horizontal turbine and the only auxiliary necessary with any steam turbine not necessary with a reciprocating engine operated under similar conditions is a pump for supplying the lubrication. If water lubrication is desired for the step instead of oil, a second pump is necessary for this purpose.

FOUNDATIONS.

The foundation necessary for the Curtis turbine is a matter of less importance than with any other steam prime mover, from the fact that there is no lateral strain or thrust, the only matter of importance in this connection is to provide a foundation of sufficient strength to support the weight. In many cases this can be more conveniently arranged with "I" beams so arranged as to support the weight, leaving the space below available for auxiliary apparatus.

In the case of the use of a masonry foundation

it is customary to leave a recess in the foundation for easy access to the step.

FLOOR SPACE.

The floor space occupied by the Curtis turbine is less than that required by any other steam prime mover similarly equipped of corresponding capacity, and the cubic area occupied much less than that occupied by the reciprocating unit, and no more than that occupied by any turbine and less than most of them.

RELIABILITY.

As before stated insurance against interrupted service was the first consideration in the design of the Curtis turbine.

The builders of the Curtis turbine endeavored to design first a "fool proof" machine and one which would be rugged and of such character as would remain operative under all conditions, they then aimed to make as high as possible the efficiency which resulted from this substantial design; they fully appreciated the fact, that interrupted service would cause the electric railway, lighting or power distributing company serious inconvenience. They also knew that these parties were accustomed to maintain more than one power producing unit which would enable them to tide over minor interruptions but they further realized that while unreliability would seriously handicap the turbine for this use, it would make its use absolutely prohibitive by a textile mill or other manufacturing industry which placed its entire dependence on a single prime mover.

Let us briefly review some of its more important characteristics.

The generator design is as good as the best and better than most and as you are famiilar with the reliability of this feature, we will discard its further consideration with the statement, that it is the most ruggedly constructed of all the generators at present on the market.

As previously explained the unit cannot be injured by quick starting, for steam can be admitted as quickly as possible, even if the turbine is stone cold.

Water can pass through it without injury.

Admission valves may become inoperative and others will automatically and efficiently take their place.

Vacuum may be lost and the turbine will efficiently carry full load non-condensing without it being necessary to by-pass steam.

Shaft cannot sag or buckle as there is absolutely no lateral strain on it due to weight or otherwise.

Shell cannot crack, warp or distort as live steam is not in contact with it.

Steady bearings losing lubrication cannot put the turbine out of commission, for should they run dry, there being no weight on them and the sleeve on the shaft being the harder, would enlarge them to the extent of whatever bearing there might be (under running conditions) and it would continue to spin on the step.

Should we lose our step pressure, the auxiliary step pump would be automatically started and the operator notified by an automatic alarm of the fact and should this for any reason fail to respond, the step is so arranged that the blocks can be raised as they wear, until either the pressure is restored, or the step blocks worn out, when the turbine would come to rest by friction, without injury other than making necessary the replacement of the worn blocks and the re-adjustment of whatever had interfered with the lubricant, a matter of short time and slight expense.

Under no conditions, can buckets or intermediates come in contact with anything that would tend to injure them, nor can either become disconnected or in any way disarranged.

The design, construction and operation of the Curtis turbine is such as to cause no undue stress on the piping, boilers, foundations or other auxiliaries to the extent of tending to result in leaking joints, steam-hammer or lateral strains that would in any way jeopardize the continuity of operation of any single item of the complete plant.

ADVANTAGES.

There are many advantages to be derived from the use of the Curtis turbine other than those already enumerated.

The installation of the Curtis turbine from its compact design results in a marked saving in land, buildings, foundations and equipment.

Its operation results in a saving in taxes, insurance depreciation, repairs, fuel, water, oil and attendance, in fact while local conditions vary the amount of these different items of saving it is the exception rather than the rule, where its use does not effect a saving in every item which goes to make up the cost of operation.

There are other advantages resulting from the use of this machine, which while it is extremely difficult to figure their worth in dollars and cents, make its adoption highly desirable, among these may be named: simplicity, reliability, and ease of access to all parts.

All parts interchangeable.

Latest improvements applicable to earliest machines, this is a point on which great stress is laid by the manufacturers to so design each improvement as to make it applicable to machines of earlier design.

No adjustments desirable or possible, for test conditions are always running conditions. It would therefore be impossible with a Curtis turbine to adjust it with a view to making a test and making the adjustments finer than would be permissible under commercial operating conditions, procure attractive results which would afterwards be found impracticable under operating conditions.

As previously explained an improperly designed Curtis turbine can never be made to produce good results, for this reason you are not depending upon your engineer to keep your machine up to "concert pitch" it can't get away from it.

The absence of wear prevents the possibility of any falling off in economy with age.

The Curtis turbine assists in obtaining a high vacuum and benefits from it, there being no opportunity for air leaks makes it a comparatively easy matter to maintain a vacuum 28 to 29 inches referred to a 30 inch barometer.

Its continuous rotary motion without pulsations results in absolutely no angular speed variation, thus greatly assisting in maintaining perfect parallel operation with other units, and also results in no tendency to rack foundations.

The steam flow being steady and continuous all

strains on parts are steady and continuous for which reason no part of the turbine or plant is in any way subjected to sudden and frequent strains, making necessary or desirable special provisions in any part of the plant to obviate the possibility of leaks.

The regulation is perfect and can perhaps be best compared to a perfectly regulated water wheel; this results in manufacturing plants operated from this machine being entirely free from flapping belts and consequent belt wear and angular variation in the speed of producing machinery.

The Curtis turbine maintains extremely high efficiency under widely varying loads and perhaps the greatest gain from this feature is its high efficiency at extreme over-loads, where the ability of the boiler plant to supply the steam is the limiting feature in connection with the over-load capacity as previously explained.

The oversight of the engineer in attending to drips and the detrimental results from neglecting them are absent in this particular type of turbine from the fact that there are no drips and the machine is capable of discharging any accumulation of water without inconvenience as previously explained.

From the fact that oil is not brought in contact with the steam unit, either on its interior or exterior, there is not the remotest possibility of oil entering the steam, for this reason the condensed steam delivered by the Curtis turbine is distilled water absolutely clean, and in this respect it differs from any other steam prime mover ever put on the market. We will take this feature up more in detail under the next subject.

FLEXIBILITY.

The fact that the steam is in no part of the Curtis turbine brought in contact with any foreign substance that would in any way tend to change its character, makes it applicable to bleaching, dyeing or any other work where the use of absolutely clean steam at any pressure is desired, for it can be delivered at different pressures from different stages of the machine, or where distilled water is desirable, absolutely free from foreign matter, the Curtis turbine will deliver it. I will touch but lightly on this phase of the subject, for I hope at no distant day we may have the pleasure of hearing from members of this Association much better fitted than the writer to give the results of these conditions obtained from experiences in four large New England textile mills with which they are connected, where it is proposed by the use of the Curtis turbine to abstract from the steam for power purposes, that portion of its energy not required for use in preparation work, or in other words to use the turbine as a power producing reducing valve.

The conditions under which a Curtis low pressure turbine can be installed with benefit to the user in connection with a condensing steam plant, while not productive of so large a percentage of increase, are such as will result in an increase of from 20 to 25 per cent. under these conditions, and at lower cost, as in this case, we have only to consider the cost of the turbine and the expense for the apparatus for providing the additional circulating water made necessary by the benefits derived from increasing the vacuum one or more inches which the use of the turbine makes possible.

In this case the additional power, or improvement in economy obtainable, will largely depend upon the characteristics of the engine or engines under consideration.

The principal merit of the low pressure turbine used under these conditions will be that it will increase the maximum output obtainable from the power plant, without increasing the boiler plant, and consequently entails but small increase in investment.

A 5,000 KW. engine plant was recently investigated where the maximum amount of steam available from the boilers for operation is about 120,000 pounds per hour and this when applied to the engine with a vacuum of 27 inch was capable of operating at about 22 per cent. overload. In this case the conditions of the engines were such that the addition of a low-pressure turbine would increase the maximum overload obtainable to 43 per cent. with the same vacuum of 27 inches. With a vacuum of 28 inches, the maximum overload obtainable would be increased to 53 per cent. Thus, with a vacuum of 28 inches, the increase of power amounted to 31 per cent. without additional fuel consumption and the maximum output of the plant was increased by a similar amount.

If in this case more steam were available, it would pay to use a larger low pressure turbine and a much higher maximum could be obtained without loss in steam economy. I have in mind another case, a textile mill which is electrically operated, having two generators of 1,600 and 2,300 KW. capacity respectively. Each generator is direct-connected to a horizontal cross-compound engine.

The load conditions at the present time are such that the all day output is 3,000 KW. This necessitates the continuous operation of both units and as they are synchronized on common busses they both operate at an uneconomical point.

The installation of a 500 KW. low pressure turbine, so arranged as to take steam from the exhaust of either or both engines, would result in their being able to carry the entire load from the larger unit, or if operated in series, with the smaller unit, would make it a relay for the larger unit practically of equal capacity, or used in conjunction with both units, would increase the total plant output by 500 KW. without increasing the fuel consumption.

When used in conjunction with the larger unit to carry the whole load this unit, as a whole (considering the turbine as an additional low-pressure cylinder), would result in better economy than would result from a triple expansion engine and would represent a vast saving over the operation of the two units operating at poor load factors.

TESTIMONIALS.

Feeling that it would interest you to know what satisfaction the first Curtis vertical shaft turbine which was installed in a textile mill in New England is giving, with the consent of the writer I take liberty to quote his letter on the subject.

Nashua Manufacturing Company.

Mr. Charles B. Burleigh,

Boston, Mass.

Dear Sir:—In replying to your inquiry with regard to the performance of the three-phase, re-

volving field, alternating current, 600 volts, Curtis vertical shaft steam turbine, installed in our mill in January of this year, by Mr. Charles H. Austin of this city, I would say that it has been most satisfactory in every particular.

The regulation is almost perfect and the attendance required is very much less than with a reciprocating engine.

We have no expense whatever in the way of repairs and were we contemplating the installation of additional apparatus, we would certainly instal more units of this character.

Respectfully yours,
R. S. Milliken, Agent.

I feel that one of the best testimonials which the Curtis turbine could have, is the fact that none of those who have ever used them have ever added to their capacity by the installation of reciprocating units, while seventy users have purchased a second, twelve have purchased two additional units, eight have added three units, six have added four units, three have added seven units and one concern has from time to time in the last three years purchased fourteen units. In other words approximately 250 concerns have purchased Curtis vertical shaft turbines. One hundred of them, or 40 per cent., have placed further orders for the same apparatus, which is pretty good evidence of two things, first that results obtained confirmed their original judgment and second it indicates, in a way, that their business prospered under their use to the extent of making an increase necessary.

The discussion that followed showed the great interest taken by the cotton manufacturers in the steam turbine. Mr. Burleigh was called upon to answer many questions on the advantages and cost of operation of this type of power equipment.

A paper on Practical Experience in Electric Driving was read by John A. Fernley of New Bedford, in part as follows:

PRACTICAL EXPERIENCES ON ELECTRICAL DRIVING.

JOHN A. FERNLEY, New Bedford, Mass.

I do not think that anyone today seriously doubts that electrical driving has many advantages over either the rope or belt drive, and certainly the writer's experience has proved that they are neither few nor small, still, on the other hand, there are many people who think that its advantages are offset by its cost of installation, etc., coupled with a vague suspicion that it is not thoroughly understood, and is apt to cause a greater amount of trouble than either the belt or rope drive; and so conclude to stick to the old methods; while others who are satisfied as to its advantages as given by its advocates and friends, want to know what the results are in actual working, and whether it can be handled with success in an ordinary cotton mill, stating that while they are convinced of its advantages in general, they want to be enlightened as to its every day working.

To be able to clearly understand and give full consideration to the arguments for or against an electric drive, we must keep in mind the fact that electricity is not a primary energy, but merely a secondary power that depends upon a mechanical plant to generate it. Coal must be used to develop the mechanical energy before the electricity is generated and therefore, there is no advantage in this respect, the cost being about the same for the production of horse-power in either system, the difference being, that in one case the power has to be carried to its destination by a series of belts, thus providing one large unit from which all the subdivisions derive their power; while in the other it is developed into electricity and by wires carried to the switch board for distribution around the mill and then subdivided into many units of different capacity, each one of which is entirely independent from the others and can be controlled either in the mill or engine room, without interfering with the operation of any of the other units.

These units are known as induction motors, and are simply a machine used to change the electrical into the mechanical energy, and depend upon the amount of electricity as expressed in volts and amperes, for their efficiency.

Thus we find that a double process is required in electrical driving before the energy is at the point where it can be used and between the changing of the steam power into electricity, and its conversion back into mechanical energy by the motor, there is quite a loss of power.

When a motor is built it is wired and wound to perform a certain amount of work and is in two parts, termed the "armature" and "field". The field is charged with electricity from the generator and as a result the armature is made to revolve and thus operate the shafting. The higher the load, the more resistance there is to the action of the electricity and this produces a loss of speed which in some cases reaches as high as three per cent. between the full load and no load speeds. It will be readily seen that if the full current was thrown into the field at the starting of the motor, it would have to start at its highest velocity, owing to the fact that the load would be at its lowest point and this, of course, is something no machine could stand. To get over this difficulty, in each motor is placed what are known as "resistance" grids, the functions of which are to take some of the electricity away from the motors and thus enable them to be started at a sufficiently low speed, and after a few seconds these grids are gradually cut out or short-circuited and the motor brought up to its full speed.

It is right at this point where one is apt to find out that there is more to the successful running of an electric plant than appears on the surface of things and where experience comes in to teach many lessons. In the first place it is necessary that someone shall be responsible for the starting up of the motors and this means one or more persons in each room. I notice Mr. Merrill in his paper read before this Association at the spring meeting of 1905, stated that "In some cases, all the motors on one floor are arranged to be controlled from the same station, thus allowing one operator to start quickly, the entire department." It is clearly impossible for one person to do this and yet preserve the individuality of the different units and to destroy this individuality would take away one of the principal advantages that electricity has over any other kind of drive.

The employment of so many different people in the starting of the motors involves danger from the fact that upon the way in which the work is done, depends the whole power of that particular unit, for should the electricity be switched on with the resistance out, the motor is apt to be put out of commission, while on the other hand if the resistance is left in too long they are liable to become overheated and weakened with the result of the loss of that unit of power until repairs can be made.

I know of several different cases where trouble has occurred, in one instance, the grids were burnt out before the mill had been running very long and before the officials were aware of the desirability of having spare sets on hand, with the result that the machinery was stopped until a set could be made for this particular motor, which, with the time taken up by transportation, etc., took up quite a long time. The only safe course is to have a complete set on hand for the different horse-power motors and where a mill is equipped with machines ranging from 10 to 200 horse-power, it means a large outlay for supplies that may never be used, but which should be obtained when the motors are installed, so as to forestall any difficulty that may arise should they give out.

The next of importance in the motor is the "air-gap" or the space that is left between the revolving armature and the stationary field. This space is made as narrow as possible owing to the fact that the permeability of air is very low, and therefore, the smaller the space that the current has to cross, the greater the efficiency of the motor.

It will readily be seen that in a room where there is a large amount of dust and cotton fibres in the air, such as is found in card rooms, etc., this air gap will soon become more or less filled with the same, and thus in a measure insulate the field from the armature and give the current an added resistance to overcome before doing the work of operating the machinery.

To overcome this it is necessary to have the motors thoroughly cleaned out, by blowing out this accumulation of dust and dirt. The time between such "blowing off" depends entirely upon where the position of the motor is, but I incline to the idea of giving it a good cleaning at certain stated intervals rather than to simply clean it a little every day.

About the only effectual way to get this lint and dust from the interior of the motor is to install a compressed air system; the pump for which may be placed in the engine room basement or other convenient place, and to carry this air by means of pipes to every motor in the mill, placing a valve on each side of the motor. Select some man to attend to this work in the different rooms and provide him with about six feet of very strong rubber hose, capable of withstanding a pressure of about fifty-five pounds. Have it understood that the air must be applied to each side of the motor more than once, blowing from one side and then the other alternately. The reason for this is because there are so many crevices and angles in a motor that blowing from one side alone would only distribute the cotton dust around the inside of the motor.

Then the electrician should go over the motors and inspect them, testing them with the gap gauge to see that there is no danger of the armature touching the field.

This test should be carried out often, for upon it depends the very life of the motor. As stated earlier in this paper, for plain reasons the motors are made with the air gap as small as possible; and should the armature through any cause move out of its proper position, it would come in contact with the field and thus burn out the motor. This, of course, is something that may never occur, but any person knows that bearings are apt to become overheated and melt or even to gradually wear away, unless properly attended to. This danger the gap gauge is a preventive for; but in the case of overheating, the trouble sometimes develops very rapidly, and before preventive measures can be taken, the damage is done.

I had a personal experience along this line which illustrates this point and at the same time shows the seriousness of the trouble.

In some unaccountable way, the drip-cock on one of the motors that runs the looms was opened and thus allowed all the oil to leave the bearings. The result was a hot bearing, a short-circuited motor, and a stoppage of that particular motor for a period of six weeks, owing to the fact that the motor had to be taken down and shipped to be rewound. This is not an isolated case, for at the time of writing I know of one mill that has had an armature away from the mill for about three months. Take these cases in connection with the fact that the motor is an independent unit and that the power cannot be utilized in any other way, and it is easy to see how annoying and serious these breakdowns are.

There is another item which may be worth a brief reference in this paper and that because of the annoyance which is caused thereby. If you will recall I stated that there is a loss of speed between the no load and full load of a motor. This is claimed by the electric people to amount to about two per cent. but I have found it to exceed that amount in some cases. In the mule room this difference shows itself more than in any other department of a mill, owing to the fact that the load is so variable. These changes are caused by the difference in the amount of power required to operate a mule in its various operations and where the mules are on different numbers of yarn, cannot be avoided. The result of these variations of speed on the quality of the work soon shows itself, both in kinks and other troubles and the only help I have been able to find is in substituting a larger belt, so as to overcome the loss as much as possible.

Coming back to the generator, we are confronted with a machine which has certain advantages over the belt drive but which has also some disadvantages. There is no question but that where a mill plant is overloaded to any great extent, that electricity is preferable to belts, from the fact that a belt will only carry a certain load, no matter what the capacity of the engine, while in the case of a generator you can carry up to 40 per cent. of an overload and this at a very small loss in comparison to belts. This is an advantage which most especially applies to mills which are run by two engines and generators, both being run together as one unit, from the fact that if one en-

gine or generator is disabled, it is possible to throw a large proportion of the whole load upon the remaining generator, thus cutting down the loss to some extent, while with a belt drive the loss of the engine would be total. Still, even at this point there are possibilities of accidents that may occur which are not found in a mechanical drive.

Before it is possible to obtain any power from the generator, it is necessary to charge the field with a current of electricity, thus producing a residual magnetism from which the machine is built up. Should the "steam exciter" in any way become useless, it would mean a total suspension, because no power could be generated; so that we have an added point of danger which is not present in an ordinary drive.

Another experience which I have had recently was the burning out of a number of pole pieces or coils, in one of the generator armatures. The engines seemingly were running with their usual smoothness and were carrying a load under their rated capacity. The generator was apparently all right, when about eight o'clock in the morning, a noise resembling somewhat the roar of a cannon came from the engine room. As soon as possible the engines were shut down, but it was impossible to find out at first what the trouble was, owing to the room being filled with smoke, but eventually it was found that a large hole had been burnt through the coils, and that the solid iron casing had been burned away. Apparently, there was no cause for the accident, except that it might have resulted from an imperfectly insulated coil.

Owing to the fact that such an accident had not been expected, no spare coils were at the mill, and on telephoning after some, it was found that there were none at the works at Schenectady, thus giving us the rather unpleasant prospect of a shutdown until these coils could be made and shipped to the mill. We finally decided to endeavor to make some temporary coils in our machine shop, and see what we could do to get the machine running. It was rather a doubtful chance, but fortunately it was successful, and we were able to start up after a shutdown of two days and a half.

Apart from such troubles as these, there is no doubt but that electrical driving is advantageous, and in a large plant, more economical, than the mechanical. It is very flexible and requires a minimum amount of shafting.

In reference to the amount of power used, there seems to be but little difference in the loss on an electrical and mechanical drive, as far as getting it to the room is concerned but there is a decided advantage in favor of electricity after it reaches the motor. In any room but the mule room, the drive is more even and gives better results.

I have purposely refrained from taking up the question of power because it has been thoroughly gone into by others, but I wish to state that I am satisfied that a large motor is more economical and satisfactory than small ones, although not quite so convenient.

The session concluded with a paper on the Drawing-In of Warps by Machinery.

THE DRAWING-IN OF WARPS BY MACHINERY.

E. F. HATHAWAY, Boston, Mass.

I wish to say a few words regarding a certain department in the cotton mill, which, while considered from a standpoint of simple cost is probably one of the smallest, but when you take into account its trouble causing qualities I believe you will all agree with me that it is the star department.

I am speaking now of the web drawing or drawing-in. The help in this department are of the higher class of mill operatives. They earn fairly good wages and are consequently independent and as of late years this class of help seem to be coming more and more scarce they can afford to be more independent.

On the class of work they do we have heretofore depended for the smooth running of our looms and on the amount of work they do has depended the running of our looms at all.

And now as I stated before, although the drawing-in of warps in itself has to bear but a small portion of the cost of manufacture of cotton goods, nevertheless, it being an essential preliminary to successful operation of the weave room, it forms an important factor in the process of economical production. It being in most mills the last and only operation which is now done by hand, has caused it to be a very attractive field for inventors all over the world to exhibit their powers in producing a machine for automatically handling this work by machinery. The chief obstacle encountered (as far as my investigation goes) has been the accurate handling of the harness eyes. As you of course know a new harness as it leaves the harness maker is substantially perfect, having a perfect lease, each heddle alternating consecutively with its neighbor on sides of the top shaft. When this harness is new and in perfect condition it has been no great effort to produce a lease picking mechanism which would separate the harness eyes with a fair degree of accuracy, which fact has deceived many inventors (working invariably on a new set of harness) into thinking that they had solved the problem, even then, however, absolute accuracy seemed impossible to obtain and after the harness has been several times run through a loom, subjected to the carelessness of the average weaver, the harness cleaner and repair man, it is indeed a sad object upon which to attempt to put a mechanical working lease picker and expect to obtain anywhere near the result that must necessarily be obtained in a successful warp drawing-in machine.

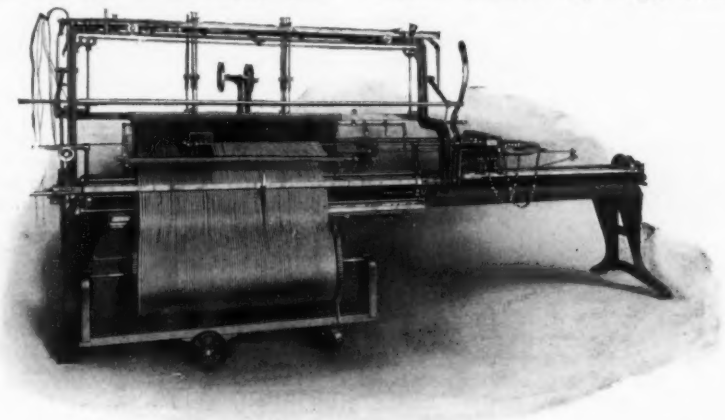
Until such a time as Mr. M. F. Field, who is now associated with the American Warp Drawing Machine Company conceived the idea of putting some kind of an appropriate spacing device upon the heddles, I can find no record of a warp drawing-in machine having come anywhere near making a successful demonstration in actual mill practice.

The American Warp Drawing Machine Company of Boston, Mass., taking the inventions of Mr. Field and putting them through a course of years of careful refinement, have at last produced a machine which is daily drawing-in warps through both the harness and reed at one operation, drawing successfully any pattern which may be desired

up to six shade work, drawing any number of ends to a dent in the reed, or skipping eyes in order to allow for drawing a lower sley in the harness than same was intended for, thus making a great economy in the harness equipment necessary to carry where the work is liable to be varied. This machine uses standard harness and reed of any make and all the requirement that is necessary is to have the harness eyes in thoroughly good

harnesses (up to six) with the same accuracy, speed and economy as it handles prints.

It is now working daily on sleys as high as 160s and as low as 42s and on yarns from 12s to 90s. The operators are much quicker taught than those by hand, as they become proficient in a few weeks. The large number of ends it handles makes it show considerable economy, as the price paid for machine operators only ranges from about six to

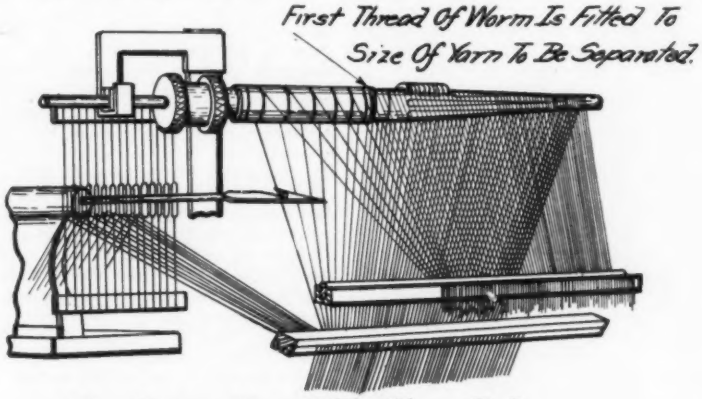


alignment and the only extra operation called for is to put on the heddles a so-called harness spacer, which, in this case, consists of a specially wound fine coiled spring which is applied to the harness in a simple manner.

Some of the advantages of this machine over hand work are as follows:

This machine is capable of replacing about four

nine dollars per week when paid day work, and when on piece work the price is usually set at about one-third the hand price, or from 3 1/3 to 3 1/2 cents per thousand ends, while against this the only extra cost is the spacing of the harnesses which only amounts to about ten cents per thousand heddles, and is only done once for the life of the harness.



The Separating Of The Warp Ends.

average hand operators as it will handle from thirty-five thousand to seventy-five thousand ends per ten hour day. It occupies only about the space ordinarily taken up by two hand frames. It can be operated as successfully by artificial as by day light. It gives much straighter warps than can possibly be obtained by handwork, thus making a great economy in the weave room. It handles any style of one beam fancies and any number of

In the operation of the machine a worm or screw, something in the shape of a cork-screw, worms itself through the harness spring or spacer, taking a heddle with it at each turn, thus giving absolute control of each separate heddle. These spaces are placed on the harness when it is new and remain upon same until it is entirely worn out and discarded without any further attention. It in no way interferes with the action of the harness

in the loom or with its durability, neither does it interfere with the same harness being drawn in by hand should the occasion arise, so that in only partially equipping a mill for drawing-in by machine it is not necessary to encumber it with a large amount of special equipment which can only be used on machine, but as I said before the standard equipment when once prepared for machine can be used by hand without any inconvenience whatever.

The reed, no matter of what sley, is carefully handled and the proper dent automatically presented for the passage of the needle by a little device termed the reed-opener. This also operates on the principle of a worm or screw and consisting as it does of a single turn of a screw thread, which, resting in the dents of the reeds and worming itself through from dent to dent, as the pattern calls and never being removed therefrom during its passage from one end to the other, gives absolute accuracy, in fact the records of machines in actual practice show millions of ends drawn without a single error in the reed.

Many efforts have also been made to produce a successful automatic warp separator and probably no one in the world has given this element of the work the amount of attention given it by the company building this machine. All sorts of separators have been produced and experimented with and hundreds of inventors have submitted their ideas for trial without success. Most of these depend upon some sort of a fine hook or barb intended to deflect one thread at a time from the edge of a series of threads held in a perfect sheet, but owing to the many obstacles encountered in the nature of variations in the yarn, uneven slashing, knots, etc., coupled with the demand for straight drawing and absolute accuracy, full automatic separators have thus far only reached the inside of the experimental room door in their struggle for practical usefulness.

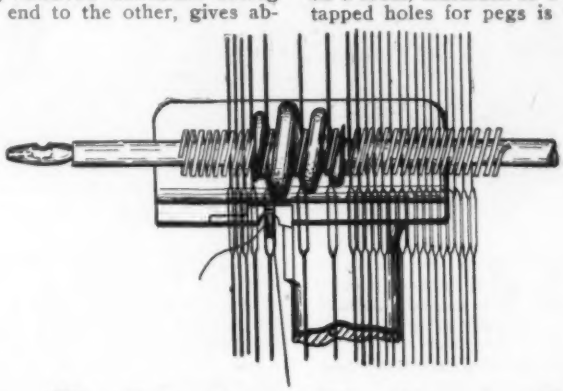
The warp separator used on this machine is semi-automatic in the performance of its duties but is constantly under the eye of the operator in its action. This warp feed also involves the mechanical "worm" principle in conbination with simple operating means giving the slope and tension to the whole body of warp threads and each component thread.

The operation of the feed as noted is semi-automatic and under such complete control that at the usual speed of 220 to 250 picks per minute an operator is enabled to do perfect work.

No additional or further preparation of the warp is required preliminary to the actual drawing-in work, it being upon the whole more simple to prepare than for hand work.

On low sleys the action of this separator is almost automatic and many warps are run through without even stopping the machine, but when the sley runs up to a very high count, or if the slashing is poor or the yarn rotton it sometimes necessitates a dozen or more stops in drawing a single warp, but these stops being very brief detract very little from the time of drawing the warp.

In the matter of obtaining any kind of a draw which may be desired each element of the machine is controlled somewhat similar to a dobby head on a loom, inasmuch as a chain pattern containing tapped holes for pegs is run on the head and all that is necessary to do to obtain any kind of a draw is to use the same number of bars in the chain as there are threads or ends in the repeat of your pattern and insert a peg wherever a thread is wanted in any one of the harnesses, or where a change of dent occurs in the reed, using a peg in every hole for the warp control and simply leaving out a peg when no warp thread is wanted.



The Selecting Of The Harness Eye.

In arranging to put this machine out for every day use in the mills the company manufacturing same was quick to realize that owing to the large amount of experimental work that has previously been done in this line and the poor success that has heretofore followed the same, the mill people were skeptical as to the results which might be obtained from a mechanical warp drawing contrivance. They consequently realized that it would be an impossibility to place this machine on the market and sell it outright at a price which it would be necessary to obtain for a machine as well built as it was necessary to have this one, so taking the foregoing into consideration the decision was made that the machine should be leased, or in other words, put out under annual rental, so that in the end, the mill would have no investment to stare them in the face and at the end of any long term would still have for their use a machine which was every bit as good as the day it was placed in their mill, besides having the benefit of any improvements which are bound to come up

through any enterprising firm which is trying to put upon the market an article which they wish to be the best that can be made.

This system, while it is a common practice with the builders of other machines, was a new departure in the line of handling cotton mill machinery and at first met with some strong opposition on the part of the mill man, but after same was thoroughly installed and many machines successfully running and the mill people had an opportunity to see the constant care and attention that was given machines placed in their mill I am led to feel that the system has met with a thorough approval of both sides, so much so that now the question of purchase is no longer ever raised, as under this system the bugbear of depreciation is not forever staring at the mill from their books, but in place they are given a machine which is constantly kept up to the highest standard of improvement.

Those who saw this machine when first put out in a form largely experimental would hardly recognize it in its present improved and simplified form and a visit to some of the mills using it cannot help but be of interest to those who wish to improve the quality and reduce the cost of their drawing-in.

This company have also perfected a tying-in machine which though it has not yet been placed in active work in the mills, will eventually supplement the drawing-in machine by handling work that cannot conveniently be drawn-in mechanically, but comparative tests have shown that when we take into consideration the cleaning and repairing of the harness, together with the fact that warps for drawing-in machines are taken direct from slasher without any special preparation, then the drawing-in machine is by far the most economical and convenient on all work within its range.

Twisting-in seems to have almost disappeared from the plain goods mill and drawing-in by hand is fast becoming a thing of the past and I predict that in another two years the drawing-in of plain warps by hand will be considered about as great a departure from economical mill practice as would be the adoption of the hand spinning wheel or the hand loom.

The last session on Thursday evening was occupied with a very able address on Child Labor by Talcott Williams, LL.D., of Philadelphia. Dr. Williams discussed the question from a broad standpoint and its bearing on the development of the race and commanded the close attention of his hearers to the conclusion of the address. The reading of the papers by Edwin H. Marble and Hugh Nelson concluded the technical discussion.

SINGEING.

EDWIN H. MARBLE, Worcester, Mass.

To give a full analysis of the different gases used in singeing machines, would take more time than the subject seems to warrant. They may be grouped under five heads: (1) gas from coal or oil, marsh gas, the city gas of our younger days a slow burning, heavy carbon gas. (2) Water gas, obtained by passing a steam jet across the surface of the incandescent mass of coke or coal. (3) Producer gas, formerly a by-product of the last, or properly speaking, a low value water gas, now obtained from regularly equipped plants. (4) Gas obtained from gasoline by means of distillation, usually called retort gasoline gas. (5) Gas obtained from gasoline by passing a current of air across the exposed surface, an "absorption" or "suction gas." These five, or a combination of two or more of the first three, are practically all of the gases used commercially at this time. Gases obtained from alcohol, wood alcohol, and other spirits and acetylene gas as yet have not, to the knowledge of the writer been brought into anything more than experimental use, as applied to the singeing of cloth.

It is usual to take natural gas as a standard in estimating the caloric value of gases and the heat units in the different gases would be expressed as follows:—

Natural gas	1,000
Coal gas	675
Water gas	350
Water gas enriched by coal gas	620-630
Retort gasoline gas of 20 candle power	690
Suction gasoline gas of same candle power varying greatly under different conditions from	560-620
Suction gasoline gas of low illuminating value called "fuel gas" or "naphtha gas"	250-330
Producer gas	150-160

While these are the values by calorimeter, the singeing values vary, as what may be a thorough combustion, without illumination, under a furnace or in an enclosed space may have a very different value when used in an open flame, as the opening of a singing burner.

The different gases obtained from gasoline enter at the present time quite largely into the consideration of singeing. The earlier gasoline gas machine was used solely because no city gas was obtainable. It was at the best a rather poor substitute, being devoid of any method of regulating the quantity or quality of the gas. The sudden change from singeing that called for a capacity of twelve or fifteen cubic feet per minute to a complete shutting off of all demand, was the cause of much trouble. The suction or cold process machines were liable to refuse to work, the excessive evaporation causing refrigeration or complete chilling of the vapor. These machines being improved by means of steam heat, gave much better service, yet still liable to irregular action. As the gas obtained from these machines was from fourteen to twenty candle power and could be used much the same as gas obtained from coal, the machine when well operated gave fair results, subject to the lack of a thoroughly automatic control of quality and quantity of gas. By reducing the quality of the gas to about two to two and one-half candle power and furnishing what is usually called "fuel gas" injecting air into the machine so as to produce a pressure of two and one-half to three inches, it gave a compound of about ninety-four parts air and six parts gas. The flame from this compound was wholly devoid of illumination worth, and of very low caloric

value. This compound can be furnished at a very low cost per thousand cubic feet, but its singeing value is about in proportion to its cost.

With gasoline gas, obtained from some of the best retort, steam or other machines dependent upon a distillate process, very satisfactory results are obtained. A very good gas of about twelve to twelve and one-half candle power can be obtained from four gallons of gasoline of about eighty-five degrees, or from about five and one-half gallons of seventy-six degrees. This gas is of very even quality and from its method of making is not subject to the variations found in the suction machines.

The cost of gasoline will determine in a great measure the use of one of the machines when brought into competition with city gas.

The writer can recall the time when the Standard Oil Co., or its agents were anxious to have bleacheries put in gas making machines to use up the accumulating stock of gasoline. Eight cents per gallon by the barrel was a high figure, and as an inducement, a liberal price was allowed for the empty barrel, about twice what its market value was. There was no reduction in the price of the gasoline, only they wanted the barrel back again so as to refill it as soon as possible. The steady advance in the price of gasoline, without any additional cost in the making of the same, has put the price at about sixteen cents at the present time. While a good singeing gas of seven hundred and twenty caloric value could be formerly made for about forty-eight cents per thousand cubic feet, today it is costing about eighty cents to produce an equal gas. The makers of gas machines have been considering the substitution of wood alcohol or similar spirit for the gasoline, and I trust the experiments will be as satisfactory from the commercial side as they are from the theoretic side. A report recently received by the writer gives every promise of the success of the experiment.

It is comparatively easy to obtain the cost of singeing when the gasoline gas machine is used, as the number of yards of cloth can be obtained and the number of gallons of gasoline used to produce the gas, the cost of the attention to the gasoline gas machine and the cost of the attendants who run the singeing machine, suitable provision being made for interest on investment, etc. In each case the cost would be figured a little differently and the writer would simply give surface yards of cloth and amount of gasoline.

In our test 90,000 yards of fine white muslins and lawns were well singed, both sides, in nine running hours, using fifty gallons of gasoline in a steam gasoline gas machine. The cost of the gasoline was twelve and one-half cents per gallon, net, and no labor was required except that directly connected with the handling of the cloth.

From a second establishment the following was given: A week's run of sixty-four hours actual running time gave 504,864 yards of light weight goods, both sides, of an average width of forty-two inches; two hundred and forty-eight gallons of gasoline was used costing $39.68 net; two hours' time was required to fill the gasoline tanks, and the attendant at singer received $9.96 in wages, a total labor expense of $10.36. This gas was also from a steam gasoline gas machine.

With suction or absorption gasoline gas the results are not quite as satisfactory, though some figures were very similar to the above. With producer gas, figures still lower were obtained, but the low cost of gas was given as it was using up a by-product of a regular gas plant and figured at a very nominal sum.

A comparison of gasoline gas and city gas has been made in two instances with results very favorable to the former when gasoline could be purchased for sixteen cents or less, and city gas twenty-five per cent. to thirty per cent. water gas cost $1.05 net. One establishment figures a saving of fourteen and one-half cents per running hour for gasoline gas under these conditions.

In making any definite statements as to the comparative merits of different singeing appliances, at least three different elements must enter into the deductions. The quality of the singeing; the condition of the fabric before singeing; and the most economical mixture of gas and air to produce the singeing flame. What test have you for comparing the quality of the singeing? The goods are usually wet out at once, they may be hand wrung out and rubbed, but it is simply a matter of the judgment of the tester, his eye being the only means of determining the efficiency or inefficiency of the work; again two similar pieces of cloth may be used for entirely different purposes and what would be satisfactory in one case, be far from close enough in the second. This test must be only a comparative one.

It is sometimes asked how I can determine if my machine is doing all that the builder intended it should? Has he adjusted it to suit the particular gas furnished by the works connected with his establishment, while I may be using an entirely different gas, at a different pressure, requiring a different quantity of air at a different pressure. Such questions can only be answered theoretically—a few experiments would probably solve the problem.

The lack of complete singeing may be owing not alone to the quality of the flame, but to the improper adjustment of the contact or burner rolls to the flame. The hottest part of the flame should come in contact with the cloth at a point horizontally opposite the centre of the roll. Now you ask me how to determine the hottest point of the flame. Careful observation would decide if one is familiar with flames, but a crude device is more conclusive evidence. Along two feet of stick drive a series of wire nails about three inches apart, remove the burner roll so as to have clear access to the flame, rest the first nail on the burner and raise the last nail about five or six inches above the burner, keeping all the nails in the flame. As the nails are brought to a red heat by the flame it is readily seen the distance above the burner outlet where the flame shows the hottest and the centre of the burner roll should be set at this level.

A second consideration is the perfectness of the combustion. A plate of copper held against the flame is a good test for the amount of oxygen. If it becomes sooted, not enough oxygen is furnished, if it turns black with the black oxide of copper it is evident that we have an excess of oxygen.

In giving data collected from American establishments, the writer would thank some of the

members of this Association who have kindly furnished important information on this subject, and this data as compared with such as is obtainable from foreign sources, shows that we are getting results quite as favorable as are they. In making this statement, do not think that we are perfect in this department, as it is quite evident that a little more attention would improve conditions, and in some instances show a marked decrease in cost. The gas used varied from a high quality hydrocarbon made from coal of a calorimeter test nearly 700 to a compound of 50 per cent. coal gas and 50 per cent. water gas which has not above 630 units. Tests abroad place this last as about 18 per cent. less singeing value than the first—judging from figures obtained from American establishments it is from 10 per cent. to 15 per cent. less value. Though it is difficult to compare values unless conditions are identical.

The usual practice is to take the gas direct from the mains controlling the irregular pressure by means of a mercury governor, this pressure, as controlled, should not show a variation greater than from two and three-fourths inches to three inches water column. The air is supplied either by direct connected blower or in a few cases one blower supplies several machines. A pressure of about four and one-half inches is sufficient in most cases, though a greater pressure can be cut down by the regulating valves.

The gas costs from 85 cents to $1.05 per thousand feet, and in a few instances the gas companies have realized that the gas used for singeing as well as other manufacturing purposes, can be furnished during the day time at a less rate per thousand than during the regular illuminating hours, and when an establishment uses from 50,000 to 75,000 feet per week it is quite an item to be considered from the financial side.

In one instance, within a few hours, goods varying from four yards to a pound, to some of which it required thirteen and one-half yards to weigh a pound were run, the only adjustment being in the flame. The cost of this was a little less than one mill per running yard, the goods averaging 32 inches in width.

With a gas containing about 25 per cent. water gas costing 90 cents per thousand feet, the average cost per square yard was approximately one mill.

A test made on 30-inch goods weighing 3.9 yards per pound gives a cost of about 17 1/2 cents per thousand yards. This was obtained from gas of the proportions of 60 per cent. water gas, 40 per cent. coal gas, and about 640 heat units. On a fine lawn, sheer-finished, a run of ten hours duration was made under careful supervision with a city gas which contained about 25 per cent. of water gas. The goods were taken from a warm dry room and four burners were used, two for each side of the goods. Everything was favorable to the best results, and a speed of 120 yards per minute was obtained. The gas cost per thousand square yards of cloth was a little less than 13 cents. The goods were evenly singed and the mesh was cleaned out so as to show a lacey fabric. A heavy threaded open fabric, in fancy design, which called for a very lacey singe, was handled for about 17 cents on the same machine and under similar conditions.

In some of our establishments, the singeing machine is run in connection with a shearing machine with very satisfactory results. The shear removing the longer threads as well as much of the nap or fluff, and the goods thus prepared are much more cheaply handled on the singer. By an arrangement of connections and drive, the machines are easily operated and the adjustments are such that the strain on the cloth is reduced to a minimum.

While most of the establishments are obliged to handle all weights of fabrics, a few that confine themselves to one particular line of fabrics, are capable of showing very much more satisfactory results. A special outfit for a particular purpose, must show to better advantage than an all round outfit, used as occasion demands.

As already stated the condition of the goods as they come to the singeing machine has much to do with the cost of the work. In the case of sateens it was found that they contained from 6.5 per cent. to 7.5 per cent. of moisture, and when the goods had laid for some time in an open damp place, the amount of moisture was increased to ten per cent. This moisture must be removed either by drying the fabric immediately previous to the singeing or in the singeing flame. The cost of each method has been carefully figured out by experts abroad and from a few experiments made in this country The results while not exactly the same, are very similar.

A French writer has made these deductions. On goods taken directly from stock and depending wholly upon the singeing flame to produce results, it required 5,000 feet of gas. The same goods rough-dried and singed required only 2,550 cubic feet of gas. The loss by moisture was 7.3 per cent. and to dry out this amount nearly 50 per cent. of the gas was used.

An American test showed about 6.8 per cent. of moisture and the same goods were singed at a speed of 115 yards per minute rough-dried, and 85 yards per minute as taken from the stock room. The singeing results were as nearly alike as the eye could determine and a saving of about 33 per cent. was figured in the cost of the gas. The question of removing the moisture by drying cylinders was determined by a comparatively close connection being made from a set of cans to the singeing room, and the cost of running the cans figured. It was found that four cylinders were required to well warm the cloth and eight cylinders rough-dried it. To sum up the conclusion of the experimenter, he expressed himself substantially as follows: "Four gas flames are a great deal more convenient and cost less than two gas flames and the nuisance of a set of drying cans running in connection with them."

Some foreign tests result in the following deductions. If gas of 650 heat units is furnished at 85 cents per 1,000 cubic feet, it is cheaper to use the flame than the cans. At 90 cents, the results were about equal on ordinary sateens, and above that figure per 1,000 cubic feet the advantage was in favor of the cans. These figures seem to include only the steam and gas costs, extra attendance not being considered.

In conversation with a German superintendent, he states that at two establishments tests were made which showed twelve cans twenty-three

inches diameter and two flames produced about the same results that four flames did, the speed of cloth being 124 metres per minute.

A few attempts have been made to combine with the singeing machine a drying device. One or two copper cylinders have been attached so as to warm up the goods. It requires something more than warming and these few cylinders did not seem to produce very satisfactory results, though of course, were a little help. A singeing machine arranged to utilize the heat of combustion somewhat similar to the economizers attached to the steam plants, might show much better results.

So far as we have studied this subject from the standpoint of a singeing engineer and the results, rather than the machine have been considered. Let me now drop that part and endeavor to occupy the position of mechanical engineer for the remainder of the time. A five-burner singeing machine has for the different working parts, the bronze burners, each with its pair of bronze burner rolls, the brass carrier rolls, so located that of the five burners, one or two can be used for the first side singed and the remaining burners for the other side or all of the burners can be used on one side of the goods. The high arch gives ample run of cloth between the flame contacts. The gas and air for each burner is controlled by independent cocks while the shut-off cock for the gas is operated by the lever in front. This same lever is connected to the air supply pipe valve, in such a manner that while the gas is let on before the air so as to give easy lighting, it also is cut off before the air so that any unconsumed portion of gas and air in the burner is blown out by the last portion of the air blast. A smoke hood over the entire machine is arranged to catch the larger part of the products of combustion and unconsumed portions, and from this a pipe carries off the same to a chimney. At the front of the machine is attached a measuring drum and recording dial and at the back is placed a water-box through which the goods pass before they are squeezed out by the draft rolls. These draft rolls are metallic and gear-driven, the lower one either felt jacketed or rubber covered and the top of brass. The cloth passes from this machine to either creel or folding-down device or it may be carried through dead eyes in rope form to the pit. To allow a change of speed of cloth, a set of cone pulleys is provided, the belts connecting the same being guarded from any droppings from the flames or cloth. The blower is driven through countershaft direct from main shaft and any varying of the speed of the cloth does not affect this.

STEAM BOILER INSURANCE; A CONSERVER OF CREDIT.

HUGH NELSON, New York City.

In the field of life insurance, the public demand for reform, both at home and abroad, has invaded legislative halls, and as a result laws have been passed which should cause a peaceable solution of the difficulties between the insurer and the insured. The recent appalling catastrophe on our western coast with its far reaching results in the way of monetary loss and financial disaster, at which the whole civilized world stood aghast, illustrates most strikingly the great value of insurance corporations to a community in emergencies of this character, bringing about the prompt restoration of credit and the starting of the wheels of industry anew. Such results, however, must of necessity cause a heavy drain upon the surplus of the companies, thus entailing increased responsibilities and problems in which both insurer and insured must for mutual protection take a deep interest. The casualty underwriter is also going through a period of doubt and anxiety, when he scans the records of increased losses, and realizes that the statutes of many states are placing upon the employer of labor additional burdens and responsibilities, while granting to the employe added protection and enlarged privileges in case of accident. In the light of these facts is it not fair to presume that the manufacturer and mill owner, who is as well a steam user, is interested in the discussion of a question having a direct bearing not only upon the efficiency of his motive power, but also upon the still broader question of placing the financial responsibility in case of disaster?

Having expended much time and money in perfecting his plant, the prudent manufacturer will take every precaution to maintain the same in the best possible condition. The most important step in that direction lies in securing the services of an expert inspector whose practised eye and trusty hammer should discover any defect or imperfection, and whose experience and skill should enable him to apply or suggest a prompt remedy for the trouble. The lot of the boiler inspector of today is not an enviable one: criticised by superintendent or engineer because he embodies in his report a statement of the true condition of a badly managed steam plant, or calls attention to defects that require the expenditure of money; pronounced incompetent by the boiler manufacturer because he discovers that a failure to observe closely the specifications and plans has resulted in a badly constructed boiler, he is finally compelled to shoulder the responsibility and frequently the blame in case of explosion and consequent loss. While few will speak of the valuable services rendered by a conscientious expert of this character, it is a well known fact that to his watchful care is frequently due the preservation of property and life. It is a matter of absolute proof from the statistics of nearly half a century, that not only the efficiency, but the life of the boiler, if we may use such a term as applied to an inanimate object, is greatly enhanced by a periodical inspection under the trained hand and eye of the expert. It is frequently said that the engineer is an expert and a most capable man, and that no other inspector is needed.

The most unsatisfactory inspector from a practical standpoint is the man who, day after day, stands by the side of a boiler to which he gives his undivided attention. Wedded to this special type and from constant association thoroughly familiar with its workings, he fails, like the mother whose one child is the darling of her heart, to see its faults or possible defects. Why, may I ask, should the owner of the modern sprinklered cotton mill with all its appliances for the diminution and prevention of loss in case of fire, and subject to the inspection of the expert, fail to safeguard his property and the lives committed to his charge

by obtaining the same expert inspection of his boilers and proper protection in case of loss? If the auditor or bank examiner is at times a necessary visitor to the counting rooms, why should not the outside expert in engineering be equally as important, as an overseer of the steam plant, to discover and correct faults of construction or mismanagement? The textile manufacturer must realize that he has within the four walls of his boiler room a subtle power which, when harnessed and properly controlled, is a harmless and most effective medium for the propulsion of engine and machinery, but when, through lack of vigilance or as the result of some latent defect, it bursts its bonds, no more fearful engine of destruction can be imagined.

Having considered the question of the value of expert inspection from the standpoint of efficiency of motive power and preservation of property, we pass to the main subject of this treatise, viz: the necessity of protection in case of loss as the result of a steam boiler explosion for the better preservation of the credit of the assured. There are several classes of individuals and corporations whose interests would be vitally affected by any diminution of the producing power of the modern textile mill, as the result of such disaster as referred to above. In the first place the manufacturer must, in addition to the burden of legal responsibility, face the prospect of certain diminution and possible loss of income from a business to which he has devoted the best years of his life. If he is a mill owner as well, in addition to the loss of stock and machinery, there is a still further loss on buildings with the value thereof either impaired or entirely destroyed. Another class of individuals who would be decided sufferers in case of a loss of this character is the commission man or mill agent, who stands between the manufacturer and distributer. To such a man, whose income is dependent upon the sale of the output of the mill, the loss of the mill's producing power means loss of the season's business and in consequence total loss of income from that particular mill. When we go further and enter the money markets of the world, where the bank, the trust company or the capitalist furnish the manufacturer with the ready money on which he must depend for the purchase of large quantities of raw material, the equipment of his mills and the prosecution of his business, we at once see the value of the practical safeguards of thorough inspection and the indemnifying contract of an insurance company in case of the destruction of the mill and contents by unforeseen disaster. The prudent man, whether agent or capitalist usually safeguards his interests by seeking the protection that the fire underwriter grants, and grows fearfully nervous if his policy should lapse for a day or even an hour, and yet such a man will without apparent concern take his own risk in the case of a loss which may result in a greater destruction of property and sacrifice of life. It must be remembered that the standard form of fire policy expressly exempts from its provisions loss from an explosion of any kind "except when fire ensues and then for the damage by fire only," so that protection cannot be expected from that source.

The day is not far distant when the credit rating companies in order to protect the interests of their customers, will refuse the coveted "A a A I" to any manufacturer who fails to show, as his credentials of ability to meet all obligations, the necessary indemnifying contracts of boiler insurance and protection of profits and income.

In view of these facts shall I be considered a chimerical enthusiast, if I predict for the modern steam boiler contract covering as it does the entire main steam system, as well as indemnifying for loss of property, of life, and profits and income, its classification as an asset in the financial column of the manufacturers' ledger? In this day of broad ideas the manufacturer, mill owner or commission man must in order to keep abreast of the times and safeguard his credit, protect his own financial interests and those committed to his charge by warding off as long as possible the evil day of disaster, but he should as well be prepared when that day comes, if come it must, to transfer to other shoulders the heavy burden of financial responsibility, that follows in the train of every such disaster.

At this meeting of the Association the following resolutions were adopted:

RESOLVED, That this Association views with satisfaction the closer relations that are being established between growers and manufacturers, and the efforts being made in the South to improve the ginning and baling of cotton, and expresses the opinion that well-handled cotton will command a price that will more than compensate for the extra expense incurred.

RESOLVED, That the Secretary of Agriculture be respectfully requested to issue the annual government crop estimate on the same day as the first December ginners' report, which action will, in the opinion of this Association, tend to reduce disturbance to the market.

RESOLVED, That the thanks of the National Association of Cotton Manufacturers be, and are hereby tendered to the Hon. Julius M. Mayer, Attorney-General of New York, for his very able address of welcome to this Association.

RESOLVED, That the thanks of this Association be, and are hereby tendered to Hon. Harvie Jordan, President of the Southern Cotton Association, for his excellent paper upon the relations between the cotton producer and manufacturer, and also to John Martin, of Paris Texas, for his interesting paper upon the relations between the cotton producer and manufacturer, and also to Talcott Williams, LL.D., for his able address on child labor, and also to E. L. Brown, manager of Hotel Champlain, for the excellent manner in which he has provided for the entertainment of our members and guests.

Also, RESOLVED, That this Association learns with regret of the sudden death of Henry N. Neill, the eminent cotton statistician of New Orleans.

Following is a list of the new members elected:

FOR ACTIVE MEMBERSHIP.

Orin F. Bennett, Salem, Mass.; Obadiah Butler, New York Mills, Oneida County, N. Y.; Reuben A. Cooke, Burlington, Vt.; William E. Elsberry,

Tallassee, Ala.; C. B. Gordon, Montreal, Canada.; John W. Knowles, New Bedford, Mass.; Oliver N. Long, Philadelphia, Penn.; R. P. McLoughlin, Utica, N. Y.; Winthrop Parker, Burlington, Vt.; Joseph G. Ray, Woonsocket, R. I.; Willard W. Stearns, Holyoke, Mass.; Paul E. Sutro, Philadelphia, Penn.; George M. Traber, Perry, N. Y.; Frederick A. Upham, Three Rivers, Mass.; Walter Whipple, Claremont, N. H.; E. Wilkinson, Jr., Philadelphia, Penn.; Eugene F. Willey, New Bedford, Mass.; Kenneth F. Wood, Pawtucket, R. I.

FOR ASSOCIATE MEMBERSHIP.

James H. Brand, Jr., Montreal, P. Q.; Hermon N. Burpee, Boston, Mass.; Thomas J. Clexton, Boston, Mass.; James A. Cooper, Whitinsville, Mass.; Roland Garry, Pittsburgh, Penn.; William C. Hawes, New Bedford, Mass.; Arthur A. Haserick, Boston, Mass.; Samuel T. Hubbard, New York City; Edwin H. Marble, Worcester, Mass.; Edwin T. Marble, Worcester, Mass.; J. Franklin McFadden, Philadelphia, Penn.; Arthur N. Sheldon, Providence, R. I.; Abbott P. Smith, New Bedford, Mass.

The committee on golf carried through their program successfully and a goodly number of entries were made for the tournament to compete for the cups presented by President MacColl. Robert Burgess of Pawtucket, captured one of the cups, the other being retained for the second year by William L. Lyall of Passaic. The tournament aroused much interest and was followed by a good sized gallery.

Following is a partial list of those present:

Connecticut:
Mr. C. W. Atwood, Killingly.
Mr. & Mrs. H. C. Atwood, Killingly.
Mrs. C. A. Burnap, Windsor Locks.
Mr. & Mrs. John Eccles, Taftville.
Mr. & Mrs. Geo. W. Holt, Putnam.
Mr. & Mrs. J. R. Montgomery, Windsor Locks.
Mr. J. O. Sweet, Jewett City.
Mr. & Mrs. Geo. A. Vaughn, Putnam.
Mr. Adelbert R. Young, Jewett City.

Illinois:
Mr. Coleman D. Howard, Rockford.

Maine:
Mr. H. D. Lord, Biddeford.
Mr. C. A. Wakefield, Biddeford.

Massachusetts:
Mr. & Mrs. Geo. A. Ayer, Easthampton.
Miss Sadie M. Ayer, Easthampton.
Mr. Joseph A. Baker, Fall River.
Mr. O. F. Bennett, Salem.
Mr. F. H. Bishop, Boston.
Mr. & Mrs. Chas. A. Bowen, New Bedford.
Mr. & Mrs. H. D. Bowker, Milford.
Mr. & Mrs. H. G. Brinckerhoff, Boston.
Mr. C. P. Brooks, New Bedford.
Mr. & Mrs. C. B. Burleigh, Boston.
Mr. T. E. Burleigh, Boston.
Mrs. E. H. Chamberlain, New Bedford.
Mr. & Mrs. James A. Cooper, Whitinsville.
Mr. Samuel S. Dale, Boston.
Mr. D. J. Danker, Brookline.
Mr. H. I. Dennett, South Hadley Falls.
Mr. L. Dexter, Jr., Boston.
Mr. & Mrs. Fred N. Dillon, Fitchburg.
Mr. C. E. W. Dow, Boston.
Mr. George Otis Draper, Hopedale.
Mr. G. B. Emmons, Lawrence.
Mr. John A. Fernley, New Bedford.
Mr. George Fish, Lowell.
Mr. & Mrs. E. T. Fowler, Westfield.
Mr. & Mrs. Geo. P. Grant, Jr., Fitchburg.
Mr. Isaac Hartshorne, Methuen.
Mr. W. D. Hartshorne, Methuen.
Mr. A. A. Haserick, Boston.
Mr. &. Mrs. E. F. Hathaway, Boston.
Mr. J. B. Jamieson, Boston.
Mr. & Mrs. F. B. Kenney, Lowell.
Mr. & Mrs. John H. Lawrence, New Bedford.
Mr. & Mrs. A. H. Lowe, Clinton.
Miss Margaret Lowe, Clinton.
Mr. Rowland N. Mackay, Readville.
Mr. & Mrs. Frederick B. Macy, New Bedford.
Mr. & Mrs. Edwin H. Marble, Worcester.
Mr. J. P. Marston, Melrose Highlands.
Mr. M. H. Merrill, Boston.
Mr. & Mrs. Frank L. Nagle, Boston.
Mr. W. C. Nairn, Lawrence.
Mr. Wm. R. Noone, Boston.
Mr. & Mrs. O. L. Owen, Whitinsville.
Mr. James F. Owens, Lowell.
Mr. J. B. Perkins, Boston.
Mr. & Mrs. Frank W. Reynolds, Boston.
Mr. J. L. Sanford, Boston.
Mr. & Mrs. Frank E. Shedd, Boston.
Mr. L. T. Shurtleff, New Bedford.
Mr. A. M. Smith, New Bedford.
Mr. A. P. Smith, New Bedford.
Mr. & Mrs. A. E. Sproul, Boston.
Mr. & Mrs. W. I. Stimpson, Milford.
Mr. James Strang, Indian Orchard.
Mr. Henry H. Sullivan, Boston.
Mr. & Mrs. R. W. Thurston, Fall River.
Mr. Wallace, Easthampton.
Mr. & Mrs. W. W. White, Worcester.
Mr. & Mrs. John K. Whittier, Lowell.
Miss Helen Williams, Milford.
Mr. & Mrs. C. J. H. Woodbury, Lynn.
Miss Alice P. Woodbury, Lynn.
Miss Laura B. Woodbury, Lynn.
Miss Louise Woodbury, Lynn.

New Hampshire:
Miss Rebecca F. Doane, Milford.
Mr. & Mrs. D. D. Felton, Manchester.
Mr. J. B. Felton, Manchester.
Mr. & Mrs. M. F. Foster, Milford.

New Jersey:
Mr. & Mrs. W. H. Loftus, Newark.
Mr. Wm. L. Lyall, Passaic.

New York:
Mr. & Mrs. C. H. Clark, New York.
Mr. W. I. Cuesin, New York.
Mr. M. H. Dorman, New York.
Mr. W. R. Daroff, New York.
Mr. D. W. Gray, Utica.
Mr. & Mrs. Chas. Hayes, Jr., Utica.
Mr. H. F. Mansfield, Utica.

Mr. Chas. Robbins, New York.
Mr. Steel, New York.

North Carolina:
Mr. R. M. Miller, Jr., Charlotte.

Pennsylvania:
Mr. & Mrs. Robert Beatty, Philadelphia.
Mr. & Mrs. Harry W. Butterworth, Phila.
Mr. H. W. Butterworth, Jr., Philadelphia.
Mr. & Mrs. Wm. T. Westerman, Philadelphia.
Miss Florence Westerman, Philadelphia.
Dr. Talcott Williams, Philadelphia.

Rhode Island:
Mr. & Mrs. Robert Burgess, Pawtucket.
Mr. Henry Dexter, Pawtucket.
Mr. & Mrs. J. P. Eddy, Jr., Providence.
Mr. & Mrs. H. W. Hayes, Bristol.
Mr. F. W. Howe, Providence.
Dr. & Mrs. F. S. Jewett, Providence.
Mr. & Mrs. S. A. Knight, Providence.
Miss Mary Knoblock, Buttonwoods.
Mr. J. R. MacColl, Providence.
Mr. & Mrs. O. A. Manchester, Bristol.
Miss Annie Mayor, Buttonwoods.
Mr. Thomas Mayor, Buttonwoods.
Mr. & Mrs. E. S. Rhodes, Providence.
Mr. Robert Schaellibaum, Providence.
Mr. & Mrs. Harry M. Smith, Providence.
Mr. Walter H. Stearns, Providence.

Vermont:
Mr. Thomas Armstrong, North Pownal.

THE NINTH ANNUAL MEETING OF THE WOOLEN OVERSEERS' ASSOCIATION OF EASTERN MAINE.

The ninth annual meeting of this association was held at Guilford, Maine, Saturday, September 1. The meeting was called to order at 10.30 by the president, L. A. Houston. The minutes of the last meeting were read by the secretary, L. C. Sawyer, and approved by the association. At the election of officers, D. G. Brown, of Dover, was chosen president, and L. C. Sawyer and J. T. Davidson were re-elected to the offices of secretary and treasurer respectively. The old board of residential secretaries was re-elected with but few changes.

Some time was spent in discussing the advisability of printing a new manual for the coming year. A committee, consisting of the president, secretary and treasurer, was appointed to decide on the time and place of the next meeting, and it was recommended that at future meetings the members have the privilege of bringing ladies. After the business meeting the members and guests adjourned to the Braeburn hotel, where they gave their attention to the excellent dinner provided for them. During and after the dinner a quartet gave several pleasing selections, which added to the enjoyableness of the occasion. After the dinner teams were taken for a visit to the mills at Sangerville and Guilford, which were open for the inspection of all who wished to go through them.

Following are the new members elected: J. A. Briggs, Guilford; A. F. Edes, Guilford; W. H. Emery, Guilford; G. W. Greenbanks, Guilford; P. F. Hamlin, Madison; Willard Lord, Guilford; J. H. Parker, Dover; W. G. Ratcliffe, Old Town; A. F. Spaulding, Dover; Walter Whitfield, Old Town.

THE COTTON QUESTION.

Sulphur Springs, Texas, Aug. 21, 1906.

Editor Textile World Record:

The August issue of the Textile World Record is received, and your prompt and courteous assistance is appreciated. It is my purpose to be just to the interests of both the planter and spinner, which is the only policy that can succeed. We have a deep interest in the mills because they determine the consumption of our raw material. At the same time the spinner must keep to the same standard that justice may become the fixed policy of the producer and the consumer. Ruinous prices for cotton will certainly injure the spinner; cheap wool destroyed the sheep industry.

I have just returned from Dallas where I attended a large convention of planters from all parts of Texas. The warehouse policy was endorsed. It is estimated that over two hundred warehouses will be ready for the coming crop, and the plan to hold the cotton from the market until the established price is reached is to be enforced.

I would like to see experienced and trustworthy representatives from the spinners and growers establish reforms in the cultivation, packing and marketing of cotton. When a solution of these problems is reached land and labor will be found west of the Mississippi River to produce readily over 20,000,000 bales of cotton.

Respectfully,

A. P. Landers.

TEXTILE PROCESSES.

EDITED BY E. A. POSSELT.

SPOTTING WITH AN EXTRA WARP IN CONNECTION WITH WOOLEN, WORSTED AND COTTON DRESS GOODS.

The object aimed at in connection with this extra warp is to form spots, arranged after a given motive, upon the ground structure in connection with either woolen, worsted or cotton dress goods; said extra warp, i. e., figuring warp, resting during the time when not forming spots on the face of the structure, or the back of the latter, in some instances being stitched to the body structure, whereas in connection with other fabrics, more particularly with cotton fabrics, said figuring warp then floats on the back of the structure, until again required on the face in order to form another spot. The motives as generally used for distributing the spotting, are our plain setting, the 4-harness broken twill setting, and 5 and 6-leaf satin settings.

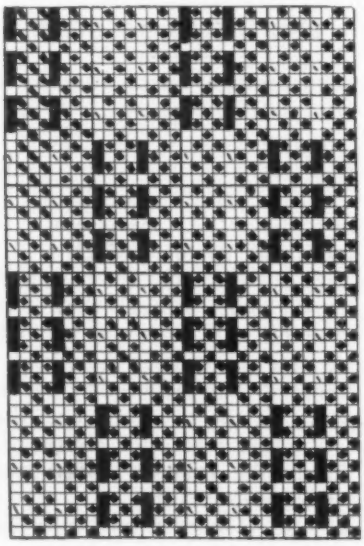


Fig. 1.

Two systems of warp and one system of filling are used in the construction of these fabrics, the ground warp and the filling being generally of plain dark colors, whereas the extra warp, i. e., the figuring warp, calls for bright colors, in order to produce loud effects, as are generally required.

For the weave of the ground structure, simple weaves like the plain weave, the $^{2}\!-\!_{1}$ 3-harness twill, the $^{2}\!-\!_{2}$ 4-harness twill, are weaves used, although in some circumstances we may meet with small broken twill effects, closely interlacing granite weaves, etc.; the proper weave required, being regulated by texture of the fabric under construction as well as the mode of fashion.

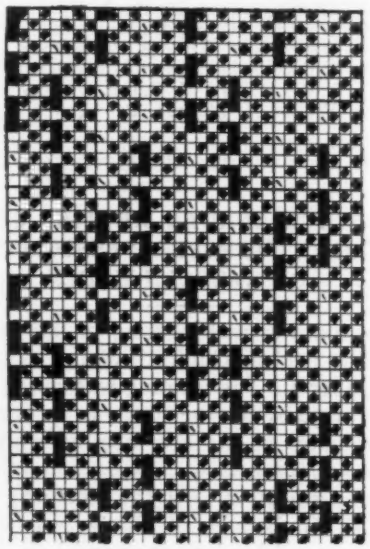


Fig. 2.

For the figure effect, as mentioned before, most any motive within compass of the harness loom may be selected, and in order to explain matters to the student, how to proceed and construct these weaves, the accompanying eight diagrams of such weaves are given.

Fig. 1 shows us an example in which the

interlacing for the ground structure is done by means of the plain weave, as shown in our diagram by ■ type. The spotting arrangement, see ■ type, is done after the plain setting, using two figuring warp threads, with three spots each on the face, for each square of the motive. [\] type shows where said figuring warp is stitched, as good as it is possible, between one riser and one sinker, to the body structure of the fabric. The arrangement of the warp in the diagram given is: one figure warp to alternate with three

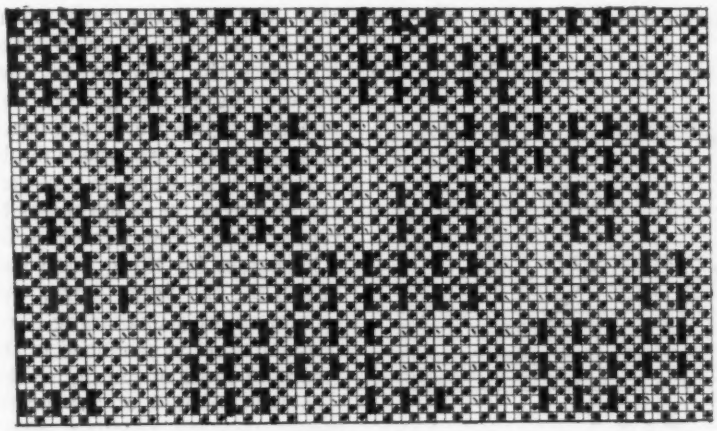


Fig. 3

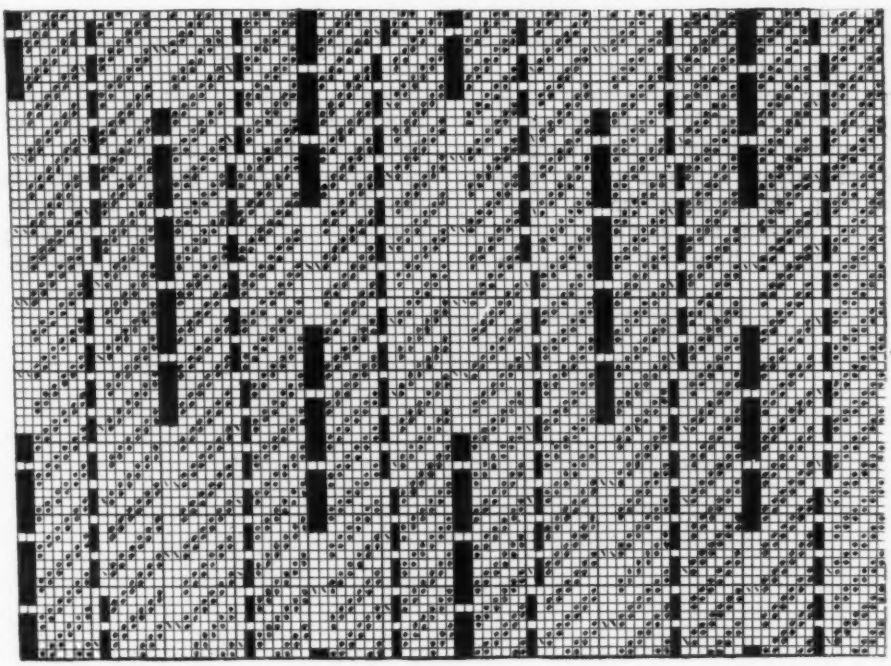


Fig. 4.

ends ground, the repeat of the weave calling for 16 warp threads and 24 picks, and which if necessary can be woven on 4 harnesses, although 8 to 16 harnesses will be the proper number of harnesses to use for practical work.

In connection with diagram Fig. 2, the

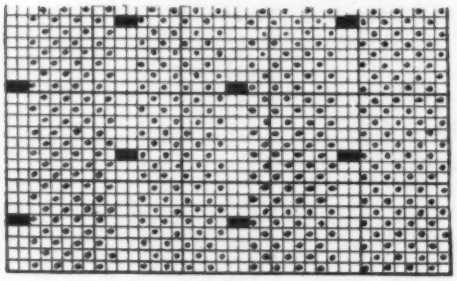


Fig. 5.

spotting selected in this instance is after the 4-harness broken twill motive, figuring in this instance with three spots filling ways, for each square in said 4-harness broken twill motive. The ground in this instance is again interlaced with the plain weave, the arrangement of ground and figure warp being: one end figure warp to alternate with three ends ground warp; the repeat of the weave calling for 16 warp threads and 24 picks and which, if so required, can be woven on 6-harnesses, although 12 or 16-harnesses will be more practical to use. ■ type indicates again the spotting of the figure warp on the face of the fabric, [N] type, the stitching of said figure warp to the ground structure, and [.] type the weave for the ground structure.

Diagram Fig. 3 shows a somewhat more elaborated design, the figuring (see ■ type) in this instance being accomplished by means of three figure warp threads with four spots for each square of the motive, and which in this instance is the 6-leaf satin setting. The ground structure is again arranged to interlace with the plain weave, the arrangement between figure and ground warp used being one end figure warp to alternate with three ends ground warp, the complete weave repeating on 40 warp and 48 picks, and which can be woven on 12 harnesses by means of its proper fancy draw, providing in this instance 4 harnesses for the ground warp and 8 harnesses for the figure warp. As will be seen by more closely examining our weave, an additional effect is produced in this instance by means of some of the figure threads running into each other, i. e., the motive as used for distributing the spotting, overlapping in its effects, thus forming an additional spotting effect on the face of the fabric.

Fig. 4 shows a very neat weave of this kind, referring more particularly to woolen dress goods. In this effect, the interlacing of the ground structure (shown by [.] type) is produced by the $^{2}/_{2}$ 4-harness 45° twill, the figuring being of two styles, i. e., single threads and double threads; both effects in this instance being shown by ■ type. The stitching of the figure warp to the ground structure (as floating on the back) is shown

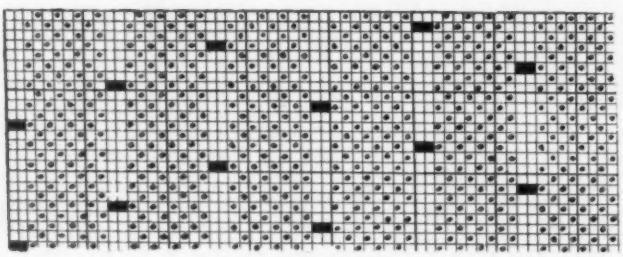


Fig. 6.

by [N] type, and in this instance is entirely invisible on account of being done between two risers of the ground warp. The arrangement of ground and figure warp in this weave is six ends ground to alternate with two ends figure; two ends of the figure warp working single and alternate with two ends figure

warp working in pairs. The repeat of this weave is 96 warp threads and 72 picks, and which by means of its proper fancy draft can be woven on 13-harnesses.

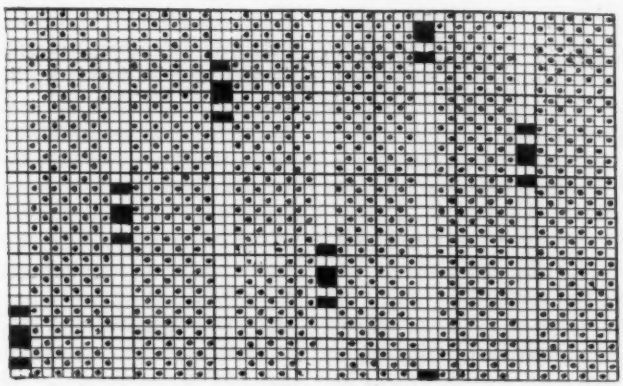


Fig. 7.

Diagram Fig. 5 shows us a neat spotting for cotton dress goods, after the plain weave motive. In this instance, we selected two figure warp threads working alike to alternate always with eight ground warp threads. The repeat of the weave is 20 warp threads x 12 picks. Remember that in this instance the two figure warp threads, as work alike, must be separated by a dent wire, i. e., must be drawn in different dents of the reed, in order that they show up clear and distinct on the face of the fabric; whereas if they would work in the same dent, the threads would twist and not produce the nice distinct appearance required for this class of fancy spotting when using two threads, in order to produce loud effects. The number of harnesses required for producing the weave in the loom

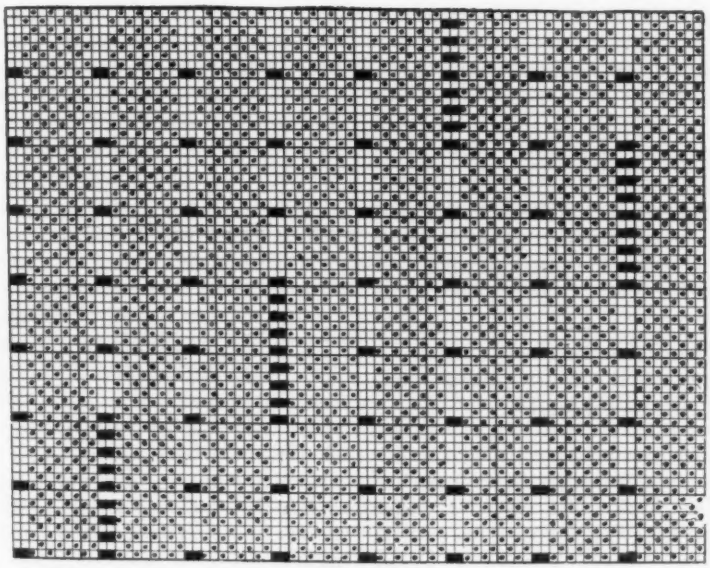


Fig. 8.

is any number of harnesses above 4, 10 harnesses, i. e., 8 harnesses for the ground warp and 2 harnesses for the figure warp being about the best arrangement possible to use for a fancy drawing-in draft for this weave.

Diagram Fig. 6 shows us a similar weave, only that in this instance, the principle of spotting observed is after the 6-leaf satin weave. The repeat of the complete weave is 60 x 12 and which by means of a fancy draw can be drawn on either 10 or 14 harnesses, either arrangement being well suited for practical work.

Diagram Fig. 7 shows us a more pronounced spotting, after the 6-leaf satin setting, ground weave and general arrangement otherwise being the same as in the previously given example, the only difference being the repeat of the weave and which in this instance calls for 60 warp threads and 36 picks.

Diagram Fig. 8 shows us a neat double arrangement of spotting, i. e., light and heavy spotting, the latter exchanging after the 4-harness broken twill motive. The distribution of ground and figure warp is again the same as in the previously given three examples, i. e., two figure warp threads to alternate with eight ground warp threads, every other pair of the extra warp threads only being used to figure after the 4-harness broken twill motive, with reference to the heavy spotting. The repeat of the weave is 80 warp threads and 64 picks and which by means of its proper drawing-in draft can be reduced as low as 7 harnesses, although 13 or 14 harnesses will produce a more practical drawing-in draft for the weaver.

THE IMPORTANCE OF SHADING TO WOOLEN FABRICS.

(Continued from August.)

This feature will be so much more important if the fabrics in question contain fancy colors and where in some instances, it only might require a slight variation in the strength of the soap solution or the scouring liquor, or both, to act unfavorably upon such fabrics. At the same time, keep track of the temperature of your soap as well as the scouring liquor and the heat in the fulling mill, it being advisable, upon goods that require much fulling, to use a cold soap. However, if a warm soap be used, be positive not to vary in temperature, and under no circumstances have the same too warm. Goods fulled too warm will not only shade-off, but at the same time, if the affair is too much overdone, it will destroy both the colors and the life and brilliancy of the fibre. Neither use a hot scouring liquor, the same may be lukewarm, but in this case, as in fulling, a uniform temperature must be constantly kept in view.

Again, we will come across fabrics in which the colors are exactly up in shade, every process from mixing the lots, carding, spinning, weaving, fulling, up to and including scouring, having been done alike and up to the standard, still we may notice a difference in appearance in the finished fabrics, due to the difference in treatment in either the gigging or napping as the case may be, the shearing, the pressing or finally the steaming, all items which may be the cause of off-shades to a lot of goods under operation. If the goods be moderately well felted, the manner of gigging will often determine somewhat the finished appearance. Let such a piece be slowly and carefully gigged, with an intelligent choice of teasels, and the finished piece will have a rich, soft feeling, and the general appearance will be pleasing to the eye. In opposition to a fabric thus handled, take a piece from the same lot of goods and finish it in a hurry or with a poor selection of teasels, and when instead of a full, soft nap being the result, the fibres will be drawn out of the structure or worn off, the fabric when finished presenting a raw and wiry appearance, although the colors may be up to shade. Such two pieces when examined side by side will not appear alike, they cannot be made up into the same garment, the quality of the finish, or the effect of the light upon it being in this instance the cause of an off-shade, the latter frequently falling upon a well finished piece with a softening effect, while it will not be so pleasing upon a poorly finished piece, a feature readily demonstrated by the fact that there are colors which will take dark at photographing, in connection with soft wool goods, while the same color in connection

with silk, i. e., a smooth surface fabric, would take nearly white.

Be careful at the shearing process, since a variation in the procedure of this process will vary the shade in the goods, for which reason always match goods to sample at the shear, such a procedure being frequently the means in discovering defects produced in previous processes.

Another important item is uniform steaming after pressing, since provided the glaze produced by pressing is not properly removed at the steaming, pieces that would otherwise shade all right will be off-shade. Summing up the matter, we cannot go amiss in stating that with care and adhering to uniformity at every process throughout the finishing of the fabrics, save such as called for by differences in weight of flannels, the best possible results will be obtained and this with a constant tendency towards perfection with reference to the shading of the finished goods.

SOME CAUSES OF IMPERFECTIONS IN WORSTEDS.

Worsteds, on account of their characteristic threadbare face finish, require the greatest of care in their manufacture from the raw fibre to the finished fabric, readily showing defects provided one or the other processes through which the fibres pass, in its manufacture of yarn and cloth, is neglected. Worsted yarn, in opposition to woolen yarn, consists of wool fibres reduced by means of the combing and drawing processes to a parallel position, the first mentioned process at the same time combing out of the stock any fibres below the standard length for which the machine is set, and for which reason worsted-yarn means a yarn composed of wool fibres nearly all of uniform length. These two points—parallelization as well as equalization of the fibres—characteristic to worsted yarn, constitute the principal difference between worsted and woolen yarn, since it is well known that in the manufacture of woolen yarn, the fibres are combined in such a way—by carding—so as to lie in every direction in the thread. For this reason it will be readily understood by the reader, that a cloth manufactured from worsted yarn will show defects much more plainly than such as made from woolen yarn, even if both should be finished the same.

This difference of showing imperfections more plainly in worsteds compared to woolens is still more pronounced, in the average fabrics of each kind, by the opposite method of finishing the two kinds of cloth. While most worsteds are generally shorn bare, so as to present a clear and distinct face, the greater part of woolen goods are gigged or napped, and when a fairly large portion of the nap is then left standing on the face of the fabric after shearing, for which reason any defects in worsted goods, caused in the manufacture of the yarn, becomes still more pronounced by this style of finishing, while in woolens they are less easily recognized and in some cases concealed entirely by its finish.

Defects in worsted yarn may be caused by a defective mixing several kinds of wool, having different characteristics, which defects, however, are not so easily discovered in the yarn as in the piece, being at the same time the cause of endless trouble to the weaver as well as annoyance to the dyer, since some kinds of wool have a greater affinity for absorbing dyestuffs than others, and when different kinds of wool are poorly mixed in the construction of the yarn, it is then impossible to produce uniformly dyed fabrics. The result in such a case will be that the fabric will be full of blotches, spots, stripes, or similar imperfections. To prevent such trouble it will be advisable, whenever possible, to only mix wools having the same characteristics, especially if the goods to be made from the yarn refer to piece-dyes. If, however, different wools must be combined in the manufacture of a yarn, the greatest of care in mixing the fibres must be observed.

The manufacture of worsted yarn is much more complicated than that of woolen yarn, for which reason all the machines in a worsted spinning mill must operate in a so much more perfect manner as compared to the machinery used in woolen spinning, in order to obtain satisfactory results. Many of the imperfections noticed in piece-dyed worsteds

can be traced to imperfect processes of carding, drawing and combing, where provided these processes have been slighted, the fibres are not laid parallel to each other, but here and there crossed, with the consequent result of a defective lustre in the finished fabric, the perfect parallelization of the fibres in the worsted thread being the means for promptly bringing out the natural lustre the fibres possess.

Imperfections in worsted yarn will also be the cause of many of these imperfections showing in the finished fabric. In connection with some of these imperfections, like for example bunches, some of them can be corrected by the burler, while others can never be removed, once in the fabric, and will remain in the piece, every endeavor made to remove or hide them having only a tendency to make them still more pronounced.

Even counts throughout the entire lot of yarn is a most important factor to perfect fabrics, since uneven counts will be the means of a somewhat different appearance of the pattern in different places, the pattern being frequently more pronounced in such places where the heavier counts show up, while less pronounced at places where the lighter counts of the yarn show. To use single yarn to take the place of double and twist yarn for the purpose of cheapening the goods, will increase the number of defects materially, single yarns being softer than double and twist yarns and more fibrous, consequently do not produce so fine a fabric. This can be readily seen by manufacturing two pieces of goods of the same weave and of the same kind of wool, one of single and the other of double and twist yarn, say for example using single 24s worsted in one case and 2/48s worsted in the other instance, and when the former will be not only much inferior in appearance to the latter, but at the same time will also have a harsher feel and be less strong.

It is claimed that single yarn used as filling imparts a softer feel to the cloth than double and twist yarn, but what is gained in this direction is generally offset by the loss of quality, uniformity and appearance.

Another defect sometimes met with in connection with worsted yarn is such as spun of too high a count as compared to the stock used, i. e., the endeavor to spin too fine a count of yarn from inferior wool; such yarn being not sufficiently elastic, is frequently full of thin and thick spots, and is apt to break easily. If compelled to use such yarns, in order to minimize the danger from defects just referred to, to the cloth, two or more shuttles should be used in weaving, and greatest attention and care bestowed to the carding, combing, drawing and spinning processes.

However, the most damage to worsteds is done by its imperfect construction, i. e., wrong texture, and when it must be remembered, that as we might say, worsteds must be made on the loom and not in the finishing room, as is the case with a great many woolen fabrics, and when consequently mistakes made in the setting of the cloth in the loom, in connection with worsteds can never be corrected in the finishing department. For this reason the worsted manufacturer must carefully consider not only the style of goods wanted, but at the same time counts of warp yarn and filling, ends per inch to use in warp and filling, i. e., its texture, as well as the plan or weaves for interlacing warp and filling threads, how wide to set the fabric in the reed, weight of the flannel from loom and its finished width and weight required. The weight of the fabric is regulated by its texture (ends per inch in warp and filling) and counts of yarn used, while its general appearance depends in addition to these two points quoted upon the weave employed, i. e., the plan used for the interlacing of warp and filling; heavy counts of yarn or loosely interlacing weaves, or both items being used in connection with the heavier weights of single cloth structures, whereas higher counts of the yarns as well as closer interlacings, are items indicating lighter weight fabric structures.

Frequently we meet with fabrics constructed with too high a warp texture and when in turn the filling is inserted with more difficulty the warp taking the filling hard as we say in practice, a feature which in turn will impart to such a fabric structure a hard, harsh, disagreeable feel to the hand, on the

loom, at once detected by the practical man, and which no amount of care during the finishing process, in most instances, can remedy. This certainly is quite different to woolen goods and where we cannot judge the final feel of the fabric until the same leaves the finishing department. Should there be difficulties in producing the proper weight, the manufacturer can resort to two methods, either using a heavier count of yarn and drawing-in the warp wider in the reed, or using in connection with the same counts of yarn, a less frequently intersecting weave with a somewhat higher texture. If goods are to be gigged or napped, the warp must be drawn in more open than for the ordinary style of worsted finish, since in this case the goods will gain in weight during heavy scouring or slight fulling.

The pattern of the weave in connection with worsteds is a most important item, and for which reason softness of feel, as well as good work in the loom are in many instances sacrificed to a novelty in design. No better and more serviceable weave for worsteds could be found than the $^{2}/_{2}$ 4 harness twill, with the $^{2}/_{1}$ 3 harness twill and the plain weave for lighter weight textures, the $^{3}/_{2}$ and the $^{2}/_{3}$ 5 harness twills and the $^{3}/_{3}$ 6 harness twill for heavier weights of single cloth structures; but the whims of fashion do not permit their continual use, and in supplying the constant demand for novelties, the manufacturer often encounters many difficulties, and when frequently hard interlacing weaves must be introduced to obtain peculiar effects. Again, in connection with worsted trouserings we meet often with two or more kinds of weaves introduced in one structure, in order to produce novelties in stripe effects, said weaves as thus combined into one fabric frequently representing totally different systems of interlacings, i. e., tight and open interlacings, and when in turn trouble will result in the weaving and finishing of the goods. Two or three warp beams may then be required for weaving such goods and when then, provided the let-up of said beams has not been properly adjusted, imperfect goods, varying in appearance, will be the result.

The peculiarities of worsted yarn facilitate to a high degree the production of novelties, but unequal take-ups of the warp should not occur in the same fabric, except they vary greatly and in turn have been taken care of by means of extra beams, and when then such combinations can be woven together, will shrink in equal proportions during scouring and offer a fairly equal face for the shear or singe as is used.

Perfect dressing and beaming of the warp is an item of the greatest importance in connection with the perfect weaving of worsteds, i. e., perfect face to the fabric, the beaming to be done in such a manner that the threads lie parallel to one another, as well as possess the same amount of tension. This point is of the greatest importance for the manufacture of a faultless piece of cloth, since provided the tension of the threads upon the warp-beam differs, it will inevitably show this defect in the fabric, by being the cause of stripes and uneven places in the latter.

The proper timing of the loom is another important item in connection with weaving worsteds, the formation of a good, open shed being worthy of consideration by the fixer, for although the width of the shed depends upon the size of the shuttle, yet at the same time, it should be more open for close than for loose weaves. He must also pay proper attention that the shuttle leaves its box at the proper moment, not too early and not too late. The fixer must also see that the let-off and take-up motions work in harmony, that the weaver gets only well wound filling bobbins, that the shuttles are in proper condition for perfect work, more particularly the let-off device for the yarn in said shuttles, i. e., that the filling leaves the shuttle eye in such a manner that only the exact quantity of the filling required by the width of the loom is passed out, in this way preventing slugs or runners to the fabric at its sides, or filling loops at the ends of the selvages. The use of two or more shuttles even in connection with single work is always advisable, not only on account of balancing any imperfections in the yarn, but at the same time for the fact that in this way any tendency of freer unrolling of the filling of the full bobbin compared to one partly

spent, is balanced, since in connection with two or more shuttles it is of advantage to the weaver, for sake of production, i. e., wages on his part, to keep the running out of bobbins balanced, hence more even cloth. The breaking of warp ends and filling threads and which often are the result of carelessness on the part of inexperienced weavers must be avoided by pushing such help to increased attention.

Provided a fabric is perfectly constructed with reference to material selected, proper spun yarn, proper beaming and weaving, the finishing should present little if any difficulties. Be careful that no defects are caused by mistakes in scouring the flannel, soft water being a great factor, and should invariably be used. If, however, hard water is the only one at our disposal, soften the same first by adding a strong solution of granulated carbonate of soda, the amount to add depending upon the hardness of the water in question. Another important item in connection with the perfect finishing of worsteds is the use of a good, reliable, pure soap, keeping to the old saying, "The best is good enough to use," and keeping your hands off the many chemical compounds met with in the market, because, although cheaper than pure soap, they are dearer in the end, if considering the injurious effect they have upon the cloth. A want of lustre to the finished fabric is often caused by exposing the goods too long in the scouring process, which then causes the cloth to felt, with the result that then the pattern is only rendered clear with difficulty. Also be sure that the fabric leaves the scouring machine perfectly free from soap. Open-width scouring machines, as used so extensively abroad, in connection with worsted goods, we should consider superior to the rope scouring machines, on account of the smoother handling of the fabric during the process.

With reference to gigging, if such is done, only dull teasels should be used, since otherwise the operation and its consequent effect upon the cloth will be too violent. The fabric should be also well brushed up on the brushing machine, previously to shearing, but at the same time the body of the weave should not be attacked. With reference to the process of shearing, the blades of the shear must be kept very sharp, in order that all the projecting fibres will be clipped without having to set the revolver too close to the fabric, a feature which is easy to injure the cloth under operation. Provided the fabric is shorn too close, it will present a hard feel to the touch of the hand. Steam lustering is practiced for the purpose of improving the luster as well as setting the goods, besides freeing them from wrinkles, for which reason it must be performed with care.

Another place for possible imperfections to worsteds is the dye house, where the dyer may meet with difficulties in producing the correct shade; again, if he leaves the fabric too long in the dye kettle, it will shrink, both in its length and width, with the consequent result of a hard and at the same time too heavy a fabric.

LUSTRE FINISH ON WOOLENS.

(Continued from August.)

After carefully leveling the machine so the two hollow, perforated, copper cloth steaming cylinders will run free, and, with the clutches out, can be turned freely by hand, pipe steam and cold water into the tees in the overhead pipes, both front and back, using one-inch pipe for steam into the smaller openings, and one and one-half-inch pipe for water into the larger openings. The valves controlling the steam and water supply should be placed near the tees so they can be handled from the same position as the valves on the machine. The pressure of the steam is not important, as it can be regulated by the inlet valve. It is well, however, to have it fairly even, so that uniform finishing will result, ordinary mill pressures of fifty to seventy-five pounds being about right. Each of the two cylinders is set in a tank, supplied with drain pipes to take care of the surplus water. The two cylinders are each seventy-four inches long to the outside of the end collars, and since it is necessary to allow at least four or five inches at each end to tie in the bag, it would not be convenient to steam cloth on the regular machine over sixty-five inches wide or thereabouts; however special wide machines, for wider fabrics

are also built. The perforated length of the cylinders is fifty-four inches in the regular machine. These perforations should not come inside of four inches from the end of the cloth when it is wound onto the cylinders, and two inches is better. When there is a wide variation in the widths of cloth to be steamed in a mill, the perforations should be made right for the widest goods. If they then extend outside of the narrowest goods, the tying in of the bag at each end will confine the steam to its work. Cloth can be rolled on to the cylinders up to thirty-six inches in diameter; more than this will result in imperfect work, since it is not practical to steam through a greater thickness. The cylinders should be wound about once and one-half around with clean, smooth burlap, of which it will take about two and one-half yards, seventy-two inches wide, to each cylinder. Wet it thoroughly in warm water to soften it. Smooth it out carefully when laying it on, rubbing it back by hand. The outside end should be straight, and sewed flat to the layer beneath. Wind tightly with common cotton twine for about six inches close to the end, leaving a tying end exposed, then diagonally three inches between threads to the other end of the cylinder, where another six inches in width is wound closely. Return diagonally across to the first end and tie down with the tying-end. This will bind down the burlap so the steam pressure will not bulge out the middle and pull the ends inward. Cover this over with about six layers of cotton sheeting of medium weight. Wet it as before, and start the end at the seam just made. Smooth it with care. Sew it down about two feet from the end, leaving a loose flap. About twenty yards in all of seventy-two inch sheeting will be needed. These burlap and sheeting jackets should be kept clean by frequent soaping on the outside, and running steam and water through from the inside. They will become dirty, however, even with these precautions, and will have to be occasionally taken off for separate cleansing by running through the washers. Whenever they become stiff to the touch, it shows the pores are full of dirt, and they should be washed. From three to six pieces may be steamed at once, according to the style and weight of the goods, and the finish required. A few trials will readily show the number of pieces to give the best results on any particular style. The pieces to be steamed together should be sewed one to the other with the nap of each on the same side and pointing in the same direction. A leader should be sewed to each outer end. The sewings should be as flat, smooth and even as possible, to prevent marking the goods, a mill sewing machine being the most desirable for this purpose. The leader or apron should be of good, smooth ticking, twenty-four to thirty-six inches wider than the goods, so that the end of the completed roll on the cylinder can be well wrapped down. In length said leader should reach once around one of the copper cylinders, and to a good distance beyond the brush, so that when the cloth is started, no part of the fabric will remain unbrushed, about five or six yards to a leader being sufficient.

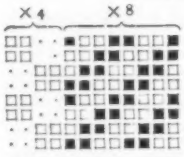
After the cloth has been fulled, washed, gigged, steam lustred or in other words passed through any of the processes of wet finishing required to be given to it in order to obtain the proper final finish for it later on, it must then be dried, so as to be able to handle the fabric afterwards in the dry finishing department. During this drying, the fabrics under operation must be somewhat stretched in length and width in order to keep them smooth for the operations of shearing, etc., as performed afterwards. When this precaution of maintaining this smoothness at the drying machine is neglected, then the after processes will act upon the cloth in such a way so as to make all uneven places and creases in the fabric past remedying, a feature which by previously keeping the cloth properly stretched during drying, cannot so easily occur. After the cloth is dried, the process in the dry finishing room is very much the same as upon other goods, only that a considerable quantity of nap is left on the goods, the length to be determined by the finisher according to sample given him.

Pressing the goods is the last process the fabric is subjected to, previously to measuring, doubling and rolling, and for which reason it must receive due attention by the

operator, in order that the work is done well. The object of pressing is to smooth the fabric, by means of ironing it, of all its wrinkles and folds, as well as to enhance its beauty of finish. There are two methods of pressing in use, viz: The old fashioned method of pressing the cloth in folds between press paper boards and heated iron plates, by means of hydraulic presses, and to which process some manufacturers, in connection with face finished fabrics, still adhere, claiming that by this process the heat permeates the cloth slowly, and in the same manner cools it slowly, and consequently that thus the pressing is set better. In some instances, belt power is used in place of hydraulic power; again pressing by means of electricity in place of heated plates is also practiced. The other method of pressing is by means of the modern steam heated rotary press, which besides perfect pressing will result in a considerably larger production, and consequently saving in labor, time and expenses to the mill.

FOREIGN NOVELTIES.

Worsted Melton Suiting.



Complete Weave. Repeat 80×4.

Warp—3960 ends, 8 harness fancy draw.

Reed—14½×4=68¼ inches wide in loom.

Dress—

2 ends, 2/40s worsted, brown olive mix 2 ends, 2/40s worsted, green mix	× 8	= 32 ends
2 ends, 2/40s worsted, brown olive mix	=	2 ends
1 end, 2/40s worsted, green mix	=	1 end
1 end, 2/40s worsted, dark brown mix 2 ends, 2/40s worsted, brown olive mix 1 end, 2/40s worsted, green mix	× 7	= 28 ends
1 end, 2/40s worsted, green mix 2 ends, 2/40s worsted, brown olive mix 1 end, 2/40s worsted, green mix	× 13	= 52 ends
1 end, 2/64s worsted, green 2 ends, 2/40s worsted, brown olive mix 1 end, 2/40s worsted, green mix	× 2	= 8 ends
2 end, 2/40s worsted, green mix 2 ends, 2/40s worsted, brown olive mix 1 end, 2/40s worsted, green mix	× 3	= 12 ends
1 end, 2/40s worsted, blue 2 ends, 2/40s worsted, brown olive mix 1 end, 2/40s worsted, green mix	× 2	= 8 ends
1 end, 2/40s worsted, green mix 2 ends, 2/40s worsted, brown olive mix 1 end, 2/40s worsted, green mix	× 4	= 16 ends
1 end, 2/40s worsted, green mix	=	1 end

Repeat of pattern: 160 ends

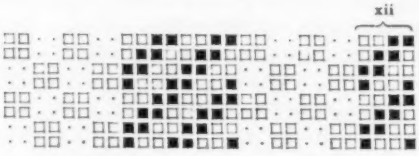
Filling—60 picks per inch.

1 pick, 2/64s worsted, blue 3 picks, 2/40s worsted, dark brown mix	× 2	= 8 picks
12 picks, 2/40s worsted, dark brown mix	=	12 picks
1 pick, 2/64s worsted, green 3 picks, 2/40s worsted, dark brown mix	× 2	= 8 picks
160 picks, 2/40s worsted, dark brown mix	=	160 picks

Repeat of pattern: 188 picks

Finish—Worsted Melton finish, scour well, full slightly, clip on shear, 56 inches wide.

Worsted Suiting.



Complete Weave. Repeat 68×4.

Warp—3672 ends, 8 or 16 harness fancy draw.

Reed—14×4=65½ inches wide in loom.

Dress—

8 ends, 2/32s worsted, black 1 end, 2/36s worsted, dark gray 1 end, 2/32s worsted, black	× 4	× 2 = 32 ends
1 end, 2/36s worsted, dark gray 1 end, 2/32s worsted, black	× 4	= 8 ends
2 ends, 2/32s worsted, black	=	2 ends
1 end, 2/64s worsted, dark red brown and 2/64s worsted, dark green, twisted together	=	1 end
9 ends, 2/32s worsted, black	=	9 ends
1 end, 2/64s worsted, dark red brown and 2/64s worsted, dark green, twisted together	=	1 end
3 ends, 2/32s worsted, black	=	3 ends
1 end, 2/36s worsted, dark gray 1 end, 2/32s worsted, black	× 6	= 12 ends

Repeat of pattern: 68

Filling—55 picks per inch.

1 pick, 2/36s worsted, dark gray 1 pick, 2/32s worsted, black 19 picks, 2/32s worsted, black	× 4 = 8 picks = 19 picks	× 2 = 54 picks
1 pick, 2/32s worsted, black	=	1 pick
1 pick, 2/64s worsted, dark green	=	1 pick
9 picks, 2/32s worsted, black	=	9 picks
1 pick, 2/64s worsted, dark green	=	1 pick
0 picks, 2/32s worsted, black	=	20 picks
1 pick, 2/36s worsted, dark gray 1 pick, 2/32s worsted, black 19 picks, 2/32s worsted, black	× 4 = 8 picks = 19 picks	× 2 = 54 picks
1 pick, 2/32s worsted, black	=	1 pick
1 pick, 2/64s worsted, dark red brown	=	1 pick
9 picks, 2/32s worsted, black	=	9 picks
1 pick, 2/64s worsted, dark red brown	=	1 pick
20 picks, 2/32s worsted, black	=	20 picks

Repeat of pattern: 172 picks

Finish—Worsted finish, 56 inches wide.

Worsted Suiting.

Complete Weave. Repeat 4×4

Warp—3840 ends, 8 or 16 harness straight draw.

Reed—29×2=66¼ inches wide in loom.

Dress—

1 end, 2/36s worsted, black 1 end, 2/36s worsted, gray and white	× 2	= 4 ends
2 ends, 2/36s worsted, black	=	2 ends
1 end, 2/36s worsted, gray and white	=	1 end
1 end, 2/36s worsted, black	=	1 end
1 end, 2/64s worsted, blue	=	1 end
1 end, 2/36s worsted, black 1 end, 2/36s worsted, gray and white 1 end, 2/36s worsted, black	× 17	= 34 ends
	=	1 end

1 end, 2/36s worsted, black ..... } × 2 }
1 end, 2/36s worsted, gray and white..... } × 6 = 36 ends
1 end, 2/36s worsted, gray and white..... }
1 end, 2/36s worsted, black ..... }
1 end, 2/36s worsted, gray and white..... } × 3 = 6 ends
1 end, 2/36s worsted, black..... }
1 end, 2/36s worsted, black ..... } × 2 }
1 end, 2/36s worsted, gray and white .... } × 6 = 36 ends
1 end, 2/36s worsted, gray and white..... }
1 end, 2/36s worsted, black..... }
1 end, 2/36s worsted, gray and white..... } × 17 = 34 ends
1 end, 2/36s worsted, black..... }
1 end, 2/64s worsted, green..... = 1 end
1 end, 2/36s worsted, black..... = 1 end
1 end, 2/36s worsted, gray and white..... = 1 end
1 end, 2/36s worsted, black..... = 1 end

Repeat of pattern: 160 ends

Filling—62 picks per inch, arranged thus:

1 pick, 2/36s worsted, black ..... } ×2 = 4 picks
1 pick, 2/36s worsted, gray and white ..... }
2 picks, 2/36s worsted, black..... = 2 picks
1 pick, 2/36s worsted, gray and white..... = 1 pick
1 pick, 2/36s worsted, black..... = 1 pick
1 pick, 2/64s worsted, blue..... = 1 pick
1 pick, 2/36s worsted, black..... } × 89=178 picks
1 pick, 2/36s worsted, gray and white..... }
1 pick, 2/36s worsted, black..... = 1 pick
1 pick, 2/64s worsted, green..... = 1 pick
1 piek, 2/36s worsted, black..... = 1 pick
1 pick, 2/36s worsted, gray and white..... = 1 pick
1 pick, 2/36s worsted, black..... = 1 pick

Repeat of pattern: 192 picks

Finish—Worsted finish, 56 inches wide.

THE FINISHING OF FANCY CASSIMERES.

For the fact that fancy cassimeres are continually met with in the market, no matter what the fashion of the time may be, a short description on how to finish them will be of the greatest of interest to the reader, more so for the reason that to finish cassimeres properly is by no means an easy task, requiring besides practical experience, the constant attention of the finisher.

After the woven fabric leaves the perch and where besides measuring, all imperfections, caused either by the yarn used in the construction of the fabric, or during weaving, are marked by the percher with chalk, it is then ready for numbering, burling and fine sewing.

The purpose of numbering the piece, i. e., sewing-in its respective number, as laid out for it previously to the making of the warp, will be readily grasped, hence no special reference required any more than that this number is stitched-in by a girl or woman as the case may be, at the end of the fabric, with a heavy cotton or woolen yarn of a color so as to distinguish it clearly from the shade of the color or colors as used in the fabric, white being the color mostly employed.

Burling has for its object the raising and removing all knots, slugs, bunches, draw-in on sides, etc., and also marking with chalk all imperfections that need to be sewed-in and which were overlooked by the percher before. The burling is of necessity a very particular process and must be thoroughly and carefully performed. Both face and back come in for an equal share of attention. There is no use in having inexperienced hands do this work, for they will usually make things worse instead of better however good their intentions may be. It takes a good burler to remove runners without doing damage to the face of the goods.

Sewing-in or mending imperfections in the woven flannel is a very important part in finishing fancy cassimeres, since in many cases they are close finished (i. e., thread bare finished) fabrics and where almost all imperfections show when finished, and therefore must be mended in the flannel so as to receive the same treatment as the rest of the cloth. It is essential that the sewer-in should understand the colors as used for producing the various effects in the fabric and have a good eye for imitating the latter, taking adjoining patterns for reference, both as to the interlacing of the threads as well as the coloring, thereby making a nearly perfect affair of some of the most imperfect places, certainly work which requires experience as well as attention. On plain or mixes, the weave alone will only come under consideration, all kinds of sewing-in being then more or less regulated by the kind of final finish of the fabric; thus indicating that more exact work is required for a threadbare fancy fabric, requiring little, if any, finishing afterwards, than if dealing with a face finish fabric and where gigging or napping, i. e., the nap thus raised on the face of the fabric, will cover many imperfections, never to be noticed in the finished fabric. The work, however, is tedious in the extreme and trying to the eyes; however, experience comes to the aid of the person and after awhile imperfections are corrected to a nicety which formerly appeared hard or impossible to be remedied. It will be also a good plan for the overseer to regulate the work, giving the hardest styles to be mended to the most experienced hands.

After burling and sewing-in has been properly done, the fabrics then should be carefully perched again, by a competent person, in order to be sure that every imperfection has been remedied properly, also to keep track of how much work had to be done by the menders. This second inspection will prevent any goods from going to the fulling mill except they are right, in turn saving lots of trouble and expense to the mill, for the fact that whatever needs mending in a fabric under consideration, it must be mended, i. e., corrected as good as possible before said cloth goes to the fulling mill, since after the latter process, mending is impossible.

The fabric is then ready for the wet finishing process, i. e., the fulling process, previously to which, however, such fabrics as are to be flocked during fulling are "tacked."

Tacking the selvages prevents flocks from going to the face of the goods under operation, causing them at the same time to full more evenly by forming a sort of a bag while running in the mill, for which reason some finishers also tack goods for the fulling process which are not flocked. Tacking is done either by hand or machine, the latter system superseding the former in most all the larger mills, and where the installing of the machinery necessary for this purpose, easily will repay itself in a short time.

Tacking by hand has been and is generally done by boys, who, as as will be readily understood, have to be watched closely in order that they do their work right. There are two ways of stitching the selvages, viz: either take a stitch through the lists every three or four inches, using a continuous string of twine for this purpose, pieced out as the boy proceeds with his work; or run needle and thread simply through the two selvages and tie the string in a knot, cutting off the string and repeat the affair every three or four inches. By the latter method there will be less chance for the loops of the twine to catch in the fulling mill, besides quite a saving in twine will be made, while the work will be quite as effective, if not more so, than in the first mentioned case, for if the loops of the continuous end of twine should catch on a projection in the fulling mill, the twine will break and release quite a number of stitches, thus leaving the face of the fabric more or less exposed, the same as if the goods were not tacked at all.

The advantage of tacking by a sewing machine in place of tacking by hand, is that the stitches thus made are of uniform size, and at the same time small enough to answer the purpose excellently. A long chain stitch about 7/8 inches long answers nicely for practically all classes of fabrics and it is not necessary to adjust the length of the stitch to each different fabric. The ordinary short stitches made on ordinary sewing machines which are not coarser than four or five to the inch, are not long enough for tacking goods which are fulled to any considerable extent. Short stitches of this kind will oftentimes cause the selvages to be severed from the body of the goods in the fulling process, or at best will felt in so tight that it will be impossible to pull the thread out.

The purpose of tacking is two-fold, it prevents the face from getting chafed in the fulling mill and at the same time, as already previously referred to, it prevents the flocks from getting on the face of the fabric, provided flocks are used in the process; at the same time, the goods will full more evenly. Carefully selected flocks, i. e., proper flocks, and if applied in the proper way, are all right to use in connection with a great many fabrics, and it is only when these points are not taken in proper consideration or when the matter is overdone that the flocking of goods becomes a nuisance all around.

After the goods are properly tacked, they are then ready for the process of fulling as carried on in the machine known as the fulling mill.

The points to be taken into consideration by the fuller are:

Desired weight of finished fabric,
Its finished width, and
Percentage of take-up in length,

Being items which go hand in hand, regulating at the same time the amount of flocks (if such are to be used) to be added during the process of fulling in order to get the fabrics up to their proper weight.

Fulling the cloth certainly is the most important point for the manufacturer and for which reason the overseer will have to use

the best of judgment. He has at this point to take into consideration everything in the finishing line, make provisions for all the losses sustained in the whole process of manufacturing the fabric up to that stage as well as afterwards. He has to take into consideration the amount of dirt and grease, dyestuff, size, etc., which entered into the yarn during dyeing, picking, carding, the dressing of the warp, etc., and which impurities have to be removed. He must also consider the loss sustained by the cloth under operation, by chafing in the fulling mill, by the gigging process and also the shearing, all being items which have to be provided for by the finisher in the process of fulling. In the better class of cassimeres, as a rule, all this loss is made up by shrinkage, whereas on medium and cheap goods both flocks and shrinkage are resorted to.

After having decided what is best required for the goods under operation, we are then ready to put them in the fulling mill, and when at once another very important item comes under consideration, the same being: what make of soap to use, in answer to which we only can say "The best is good enough," the absence of the proper soap certainly unknowingly having given any amount of trouble and inconvenience to many a finisher.

A wrong economy for the superintendent or manufacturer is to buy a cheap soap for his finisher, by what we mean an inferior grade of soap, for the sake of trying to save a few pennies, a feature which in turn cannot help but result in loss of dollars to the mill, for the fact that the fabrics thus treated with such an inferior soap will lose in their general handling and feeling. The soap used at the fulling mill should be of a body sufficiently heavy to last throughout the fulling operation without turning watery and still have sufficient vitality left for scouring the goods afterwards; in other words, making the latter process simply a process of rinsing the goods previously to their being fulled. A soap possessing these characteristics cannot help but be the means of laying a foundation for a perfect finish to the fabrics thus treated. Be careful to put the proper amount of soap on the fabric under operation, taking into consideration that too much is just as bad as too little; the proper amount to use for the process being the exact amount required, a feature which certainly requires practical experience by the fuller, i. e., the finisher.

If fabrics have to be flocked, do this before putting on soap. Let the trap of the fulling mill down, since in this way the flocks will be more thoroughly rubbed into the structure, breaking up at the same time creases and wrinkles made in the goods by passing between the rolls and at the same time distributing the flocks more evenly over the fabric in the mill; being at the same time careful to put on the flocks as slowly as possible in order to give the fabric a chance to absorb them evenly. Running fabrics in this way, i. e., by means of dry flocking from 15 to 20 minutes, will give them a chance to take up all the flocks required and after which the goods then are ready for soaping.

Provided a finisher should prefer to add the flocks by means of what is known as wet-flocking, take about one-quarter the amount of flocks calculated to be used, and sprinkle them lightly on the goods when they begin to get warm in the fulling mill. Then after awhile, add another quarter of the flocks, and continue in this manner until all the flocks have been added. The flocks put on in this manner will adhere as firmly as possible to the fabric thus flocked and fulled, since the flocks are thus fed to the fabric when it is in a condition to absorb them best, i. e., when the fabric becomes heated, and thus felting starts.

(To be continued.)

ADVANTAGES OF STEAMING WOOLEN YARNS.

The steaming of woolen yarns, especially such as destined for filling purposes, was originally confined more particularly only to mills running on face finished goods, like beavers, kerseys, doeskins, etc., until it was found to be also of value for yarns destined for other goods, for the reason that in an unsteamed condition, the fibres, as composing the thread, have a tendency to more or less return to the natural position they were in before being twisted into yarn. It must be here mentioned that twist is a necessity

to yarn, since "without twist no yarn;" twist, not only being a necessity to yarn, but at the same time imparts strength to the fabric, the more number of turns of twist per inch the thread receives, proportionately increasing its strength and consequently also that of the fabric, in the construction of which such yarn is employed.

Every textile student, whether manufacturer, superintendent or overseer, will have noticed that the spun thread as coming from the mule or jack constantly endeavors, when there is no counteracting force to prevent it, to rid itself of a certain number of these turns of twist imparted to it during spinning; for example, a weaver will notice it when a warp end breaks in the loom during weaving, and when frequently he must re-twist the broken end, either before or after he tied to said broken end a piece of its corresponding waste yarn, in order that the thread in question will weave, preventing at the same time any chance for said broken end showing imperfect afterwards in the finished cloth, and this more particularly in connection with clear face-finished fabrics, or goods in which double and twist yarn is used in their construction in connection with floating warp weaves, as for example satins, and when threads thus re-tied minus twisting, would show a difference in the pattern, or, at least the original is essentially changed.

Such trouble is prevented by the steaming of the warp yarn, for when then a tightly twisted thread breaks, the re-tied end retains the twist fixed in it by the steaming, and for which reason there is no necessity for the weaver to re-twist such steamed yarn provided an end breaks, certainly an advantage to the mill in preventing imperfections to the goods.

Although steaming of the yarn will make the wool fibre lose some of its elasticity, still at the same time its strength is increased by the process.

Woolen yarn, in order to weave well, must contain a certain amount of elasticity, a feature well known to the practical man, for the first thing the boss weaver will do when coming in contact with a bad warp, will be to take an end of said warp yarn, say for example one yard long, and holding each end tightly between two fingers of each hand, and see how many inches it will stretch before breaking, holding the thread thus tested upon a bench or table marked off by him for this purpose. Should there be only very little if any stretch to the yarn, a dead yarn, a yarn possibly containing any amount of shoddy or waste held together only by an excessive amount of twist, a yarn possibly stretching only an inch or less to the yard before breaking, such a yarn will naturally continually break during weaving, the yarn will not stand the strain imposed upon it in the opening of the shed as well as the beating up of the filling to the fell of the cloth. Quite the reverse to it is the case if he finds that the thread he is testing stretches, say for example, two or three inches or possibly more, and when bad weaving cannot be laid by him upon the quality of the stock, i. e., the yarn. This will explain why yarns made of one kind of wool, the one dyed in the stock a color requiring lots of boiling, will possess less stretching capabilities compared to yarn made of the same identical stock, the same counts, the same amount of twist, but woven in the gray or dyed a color requiring little if any boiling, and when the full amount of elasticity, characteristic to the wool fibre and consequently also the yarn is preserved.

Elasticity of the woolen thread may be explained by mentioning that the naturai wave or curl of its fibres enables them to be stretched to a certain extent. When said curls in connection with an unsteamed yarn are excessively stretched, the fibres in turn lose their mutual cohesion and draw apart, or the thread tears, or breaks, as we call it. However, if said curl of the fibre in the thread receives a certain stability in the position they occupy, by means of steaming, more force will then be necessary to break or tear the thread. The destruction of their mutual interlacing is more difficult, besides the thread will break more abruptly. The cohesion of the fibres in connection with steamed yarn is still further increased by the fact that the horny substance of the wool fibre swells under the influence of the steam, and that consequently the body of the thread

becomes thicker after steaming, a feature which evidently will increase the cohesiveness of the fibres composing the yarn.

These remarks will at once explain why the increase in strength of the steamed wool yarn over such as not steamed, does not always show itself in the same degree in all kinds of woolen yarn thus treated, the same varying with the length of fibre, and its greater or lesser degree of wave of crimp or curl, as also called. The latter item, as a rule, is more pronounced in woolen yarn compared to worsted yarn, since in connection with the first, a fibre of pronounced curliness is generally used, it being an item in opposition to worsted yarn and where a fibre with very slight curliness is preferred, besides the entire process of worsted spinning is directed toward a still further straightening of the already straight fibre, a feature which in turn will explain us that in proportion, less strength by steaming is imparted to worsted yarn than is the case in connection with woolen yarn.

In many instances, trouble is claimed in connection with the steaming of woolen yarn of light sensitive colors, especially white yarn, whether in the gray or bleached, the steaming turning them yellowish. Although in one or the other stray case, the imperfect construction of the apparatus may be at the bottom, however, in the majority of instances the treatment which the yarn received in steaming, as well as the kind of lubricant used in the picking room, will be found at the bottom of the trouble. High pressure of steam or excessive exposure of the yarn to its action, or both items combined, are in most cases responsible for the mischief done; either item quoted can be injurious, both at the same time making so much more trouble. Never use a higher pressure than one atmosphere, at least not for light colors and white.

With reference to length of time necessary to subject light colored yarn to steaming without injuring it, we can say: Not longer a time than to have them well penetrated by the steam, for the fact that excessive exposure may be injurious even to dark colors. From two to three minutes is the time generally allowed for the process.

Remember that the baskets in which the yarn is steamed must have open meshes, i. e., be loosely braided and made either of rattan, or galvanized iron wire, in order to offer no resistance to the entrance of the steam.

Yarn destined for warp purposes is best steamed at once after coming from the mule or jack, whereas such as destined for filling purposes gives the most satisfaction if steamed just previously to using it on the loom.

The greatest of care must be used with reference to the lubricant to be used for light colored and white woolen yarns, provided the same are steamed, cutting out the use of mineral oil, since complaints about white yarns turning yellow can be in most cases traced to such a lubricant; oleine, as free from acid as can be had, being a most suitable lubricant for sensitive colors.

With reference to the increase in strength imparted to woolen yarn by steaming, the same varies with the length of the fibre used in its construction. Tests with yarns made of short fibres have shown an increase of from 10 to 12 per cent., whereas in connection with yarns composed of long staple fibres, the increase in strength in some cases went up to 20 per cent.; facts which will readily explain why steaming takes the place of considerable sizing done in former years, in turn greatly assisting the scouring of the flannel in the finishing room and where then either none or only a very light size has to be scoured out.

Manufacturers of fabrics sometimes object to the steaming of yarn used in the construction of fabrics requiring loss of fulling, claiming that it is detrimental to the felting process in the fulling mill. They certainly may be correct in their statement, provided the steaming has been done with dry, hot steam and this at the same time with too high a pressure of steam, or steaming the yarn for too long a time. This trouble is readily overcome by locating a reducing valve in the steam supply pipe leading to the steaming apparatus, and by means of which the steam then can be regulated at will.

The United States has 863,290,035 acres of land as yet unappropriated.

CORRESPONDENCE AND NOTES

Upon Textile Topics At Home and Abroad.

THE COST OF WOOLEN GOODS.

BY EDWIN VILES.

(Continued from August.)

Weaving. We have a pricelist showing how much a weaver is paid per yard with a certain number of picks. The payroll tells us how much the weaver has earned for a period of say 12 months, and the same book tells us how much has been paid in the same time to the boss weaver, percher, fixers, dressers, filling coverers and drawers-in and other day help in the weave room; to their pay may also be added the salary of superintendent, designer and pattern winders. We find the wages paid to the day help amounted to 60 per cent. of the wages paid to the weavers, who worked by the piece. In order to find the cost of weaving per yard, we simply add 60 per cent. to the weaving room pricelist. Any allowance for shrinkage or stretching during finishing should be added after the 60 per cent. has been added.

Finishing, Dye-house Labor, Machine Shop, Boiler Tender and Watchmen. Ascertain the amount of wages paid in these departments, and see what percentage they constitute when compared with the cost of weaving as computed above and you have the cost of these departments.

The next thing in order is to ascertain the amount of general expenses. Every boss dyer will be able to tell the superintendent how much the dyestuffs cost for coloring one pound of wool, yarn or cloth of a certain shade, but I think three cents per pound is a safe figure for coloring one pound of stock. This depends entirely on the class of goods a mill is making. Each color should be figured by itself. Some goods may require no dyeing at all, while others, for example fast dark blues, will cost more than the above figure. Other expenses, such as taxes, insurance, fuel, soaps, alkalis, oils, supplies, etc., and also salaries for clerical services and for agent, should be computed for a period of 12 months. Then we should figure what proportion they bear to the payroll of the entire mill. If it is 30 per cent., for example, then 30 per cent. of the cost of labor should be added for general expenses.

In some mills where a good many patterns and selling ends are made, some addition should be made to the cost of fancy cassimeres. Ascertain the amount of yarn which is used during the season for the pattern work. This can be easily done by weighing all the patterns after they have been woven, and by allowing a good percentage for yarn waste. Taking this article as a guide, a manufacturer can figure how much the average cost of the yarn is. Then compare the yearly production of cassimeres with the cost of yarn used for patterns. If it is one or two per cent., add that amount to the total cost of the goods.

I should certainly allow something for wear and tear, and a depreciation say 2 1/2 per cent. on the cost of buildings, and 5 per cent. on the cost of machinery. If the cost of buildings is $40,000 and the cost of machinery $60,000, we should add to the cost of goods 2 1/2 per cent. of $40,000 and 5 per cent. of $60,000, or $4,000. To apportion this sum to the cost of one yard of cloth, find out what proportion it is of the yearly payroll. If it is 5 per cent., add that percentage of the total cost of labor to the cost of the cloth.

This system of estimating the cost of goods may appear at the first glance complicated, but it is flexible, and no matter what class or how many classes of goods are made at the same time in one mill, the cost price of them can be ascertained very closely with the help of tables, which can be prepared for

each department and the figuring can be simplified.

Following I will give a copy of cost sheets as I have worked them out:

Cost Sheet of Cassimeres Range in $2.00.
2880 Ends 3¼ run warp; Reed 10½×4=68" and 48 Picks fillfng 4¼ run.

Weight finished =14 ozs.		
Weight of yarn required per yard (17.65 ozs, ½ warp and ½ filling)+15% for loss in carding and spinning = 20.8 ozs. stock.		
Stock = 70% wool @ 70 cents per lb.	=	$0.049
30% shoddy @ 22 cents per lb.	=	.066
		$0.556
Sorting = 14.56 ozs. Stock @ 1.43 cents per lb.	=	$0.0137
Carding 10.4 ozs. Stock 3½ run @ 2.08 / 10.4 ozs. Stock 4¼ run @ 2.50	=	.0298
Spinning 8.83 ozs. yarn 3½ run @ 1.50 / 8.83 ozs. yarn 4¼ run @ 1.75 added 30%	=	.0250
Spooling = 2880 ends @ 0.21	=	.0060
Weaving = 50 picks = 10 cents per yd. + 60% + 5% for loss length	=	.1677
Finishing, Dyehouse, Machine Shop say 62% of cost of earnings	=	.1040
		$0.3462
20.8 ozs. Stock @ $0.556 per lb.	=	0.7228
Labcr	=	.3462
Dyestuffs	=	.0273
14.56 ozs. Wool at 3 cents per lb.	=	.1039
General Expenses 30% of labor Wear and Tear 5% labor	=	.0173
		$1.2175
Rotton Yarn 1½% of Cost		.018
Cost at mill		$1.2355

Fancy cassimeres are in most cases made out of different kinds of yarn. Silk and mercerized cotton, sometimes in large quantities, have entered in their construction and the price of such yarns should be added to the cost of goods. Double and twist is partly used in place of single yarn, and the price of the goods is thereby materially increased. To ascertain this increase, I always find out first the cost of single yarns and, following the above cost sheet, arrive at it in this way:

Cost of stock	$0.7228
Sorting	0.0137
Carding	0.0298
Spinning	0.0250
General expenses (30 per cent. of above labor = 8.91)	0.0206
Wear and tear (5 per cent. of above labor)	0.0045
Cost of yarn per 14 ozs. finished	0.8164
Cost of yarn per ounce	0.0583

Let us suppose now we are using double and twist made out of 7 run yarn in connection with the single yarn. This twist is made of all wool at 70 cents per pound, which shrinks only 10 per cent. in carding and spinning. The cost is found as follows:

Yarn required for 14 ozs. finished cloth (17.65 ozs.) 10% for loss in carding = 19.6 ozs. Stock per yd.

19.6 ozs. Stock at 70 cents per lb.	=	$0.8575
Sorting = 19.6 ozs. at 1.43 cents per lb.	=	.0175
Carding = 19.6 ozs. at 3.57 cents per lb.	=	.0437
Spinning 17.65 ozs. 2.4 cents per lb. 30% added	=	.0334
Twisting say 2 cents per lb.	=	.0221
Expenses (30% of above labor = .1167)	=	.0350
Wear and Tear (5% of above labor = .1167)	=	.0058
Cost of 14 ozs. finished yarn		$1.015
Cost per ounce		.0725

Comparing these two tables we find that the double and twist yarn costs 1.42 cents more per ounce finished than the single yarn. Suppose in our single yarn fabric we had used twist yarn for every other thread in the warp; this would have amounted to 3 3/4 ounces finished. Then we would have to add to above cost 3 3/4 × 1.42 = 5.33 cents.

Our twisting is done in the spooling room under the supervision of the overseer of that room. Figuring the wages paid to the spooler who puts the doubling on spools for the twister and those earned by the twister tender and adding pro rata the wages of overseer and yarn-carrier, the above 2 cents figured for cost of twisting will be about correct.

The exports of Sea Island cotton for 1905, according to a bulletin issued by the Department of Commerce and Labor, amounted to 40,376 bales, valued at $3,223,271, or 20.3 cents per pound.

The first duty on cotton in the United States was three cents a pound, imposed in 1790. This remained in force till 1812 when it was raised to six cents, and afterward, in 1816, reduced to the former level, and removed altogether in 1846.

TESTING SIZED YARN.

The following tests of sized cotton yarn were made in a New England mill to determine the increase of weight and strength by sizing:

TEST NO. 1

Sizing compound:

75 lbs. Sago Flour,
40 lbs. Corn Starch,
6 lbs. Tallow.
Boil one hour.
150 gallons water make 158 gallons starch.

Test.

1/32s: reel 31.64 before sizing, 29.41 after sizing. Increase of weight by sizing 7.05 per cent.

Breaking strain of 1/32s: 52 before sizing, 57 after sizing. Increase of breaking strain by sizing 8.77 per cent.

1/22s: reel 21.12 before sizing, 20 after sizing. Increase of weight by sizing 5.30 per cent.

Breaking strain of 1/22s: 79 before sizing, 94 after sizing. Increase of breaking strain by sizing 15.95 per cent.

TEST NO. 2

Sizing compound:

60 lbs. Corn Starch,
30 lbs. Potato Starch,
15 lbs. Imp. Size,
1 lb. Tallow.
Boil one hour.
150 gallons water make 158 gallons starch.

Test.

1/32s: reel 31.75 before sizing, 30.30 after sizing. Increase of weight by sizing 4.56 per cent.

Breaking strain: 1/32s is 44 before sizing, 55 after sizing. Increase of breaking strain by sizing is 25 per cent.

1/22s: reel 21.74 before sizing, 19.23 after sizing. Increase of weight by sizing 11.54 per cent.

Breaking strain: 1/22s is 71 before sizing, 81 after sizing. Increase of breaking strain by sizing 14.08 per cent.

Only one-fourth of the area of Canada is occupied and only one-eighth is under cultivation.

ENGLISH NOTES.

(By Our Special Correspondent.)

Here, and at all other European centres from which reports come, faith is strong in wool. The fall at the tail of the London sales is ascribed to the strategy of Antwerpians. Customers accept that explanation with extreme reluctance, but it is to be observed that the decline goes no further. In view of the event the market holds much material that has been badly bought. Perhaps the purchasers of the English clip are furthest off from realizing a par price for their speculation. It remains the case that buying for consumption is small, and holders look to purchasers for prospective requirements to stiffen values again. Withal the series of London sales opening September 25 gives rise to anxious interest.

* * *

Justly or unjustly the German patent office has the name of unfairness towards foreign patentees. That opinion prevails among patentees of textile processes and machinery and many of them go to the trouble of putting forward a German subject on their behalf, who subsequently assigns his rights to the British inventor. The artifice is not always successful, for German machine-builders are well informed upon developments abroad. It is alleged that the more powerful interests bring all possible opposition to bear to prevent the grant of a German patent for any invention likely to supersede their own. Their capacity in this direction is limited, but their interventions have sufficed to give birth to a sense of grievance. Some steps are now afoot to obtain revisions of refused patents for cotton-spinning machinery. For the present these are privately undertaken. Later on there may be grounds for diplomatic representations and for a reminder that these privileges are the subject of conventions and are reciprocal or nothing.

* * *

The financial arrangements of many American mills would seem to be more involved than those usual in England. We have no systematic assigning of debts, which is a practice rarely followed by other than those

at the point of desperation. The fact that debts have been assigned is accounted a black mark by creditors in case of insolvency. Nor have we much hypothecation of stock, although this system of raising funds is not unknown in the yarn trade between spinners and agents. Need of funds is more usually met by sales for cash when an extra discount varying between 1/2 and 1 1/4 per cent. is conceded.

In the main, textile people of all degrees rely upon their bankers. In different parts of the country bank terms and conditions vary. It is easier in Yorkshire than in Lancashire to obtain an overdraft and is cheaper in the North than in the South, owing to methods of calculating interest. Bankers allow themselves to be guided by the known necessities of the class of trade and the terms of credit prevailing therein, as well as by their acquaintance with the personal character of the customer. Thus in one quarter an overdraft may be had on the faith of the general soundness of the account, while in another the bank may insist on the deposit of securities. By hook or crook the manufacturer gets the accommodation he requires and from his own bank and in his own name solely.

The charges are susceptible to special adjustment, but in general are something like these: Five per cent. interest taken on overdrafts and 2 to 2 1/4 per cent. allowed on balances to credit. Commission is 1/8 per cent. on turnover, although in the case of wool dealers or cotton mills having immense business the charge may be as little as 1/16 per cent. Customers in credit may have bills discounted at bank rate and others at a discount usually 1/2 per cent. above that figure. The statement is at any rate close enough to the average to show on what terms English manufacturers obtain money.

* * *

A demand for the total exclusion from British ports of wool suspected of anthrax germs is advocated both in and out of Parliament. The authorities hesitate to take this drastic step, hoping to find a means of sterilizing the anthrax spores with formalin or some such modern antiseptic. To do so when the bale has been opened is possible, but there remains the risk to the opener. Regulations for the handling of suspected wools have been growing in stringency, but fatalities have been increasing, too. There were 114 deaths from anthrax in the three years, 1900-02, and 154 in the period 1903-05, of which 59 occurred in the last-named year. The traffic in dangerous wools will be killed if it cannot be cured and these are the sorts that are recognized as mischievous:

Mohair from the Van district of Turkey-in-Asia, Persian locks and camel hair as also hair from Karadi and Bagdad, Russian and Peking camel hair, East Indian cashmere, Pelitan and alpaca.

In one degree or another all are suspect. Those sorts are proved worst that come from Persia and China and it is the importation of them that is likely first to be prohibited.

* * *

It is complained against some of our textile combines that they are harsh in their handling of the technical chiefs they employ. The commercial man, it is represented, gets much more considerate treatment. The army of canvassers maintained by the dyeing and other associations went in fear and trembling when the mergers were first reported, but they have had little cause for complaint. Their earnings have not been reduced and their positions are secured by terminal agreements. Not so with the responsible dyer, for instance. His tenure is from week to week and changes come suddenly and for small visible reason. As branch works have been closed in large numbers, the difficulty of finding new employment is aggravated. Perhaps the changes are made necessary by trade movements and perhaps the opposition of inside men is less feared than that of representatives enjoying intimacy with the customers. Whatever the explanation, there is reason for technical men to stand out for an equality at least with the hustling manager and the business getter. They have as sound a claim as any to the dignity of a regular job.

* * *

Following on the fashion for embroidered dress goods comes a demand for cloths fig-

ured by means of loom swivels. This is being met by France and Germany because English makers have destroyed their swivels, despairing of ever finding use for them again. Hundreds have been demolished during the last four years and neither in Lancashire, Yorkshire nor in Scotland can swivel looms be found. When last these patterns were in fashion it was found that they made disastrously bad stock at the end of their run. Their season may be expected to last for some time yet, however.

* * *

The tariff squabbles of European countries although they affect silk have little interest to Americans except in so far as they indicate the extremity of international rivalry. Switzerland is now threatened with retaliation from France and for a somewhat extraordinary reason. The countries are on the best political terms and they do business in Swiss silks, taxed from 2 francs to 4 francs a kilo at the French frontier. Switzerland has been bargaining with Germany and—in consideration of separate advantages—has assented to a German tariff of 5.60 francs on her silk tissues. To this France objects, foreseeing a great advance in German silk manufacture consequent on the scotching of Swiss competition and even looking forward to the time when German silks shall be dumped below cost in Paris. The likelihood is that the Swiss-German bargain will have to be revised.

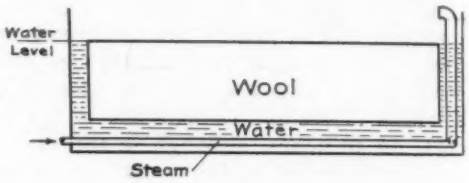
* * *

A correspondent is curious to know whether the vacuum principle of dyeing is applied to piece-goods in England and whether the system is regularly worked. It is used upon loose stock largely and upon the dyeing of some cotton cops. Dyers in general express their wonder that anyone should wish to dye pieces so when the form of them lends itself so well to other methods. Except for some problematical gain in time I find dyers indisposed to believe that dyeing under pressure could offer any inducement, although it is suggested as a possibility that the greater heat and pressure might be of advantage in securing particular sorts of finishes. They observe also that oxidation under these conditions is different from that effected in the ordinary machine and that different results from equal quantities of dyestuff might be expected.

So much for theory. I have information as to an experiment in practice. The leading firm of cotton velvet dyers made a determined effort to test the feasibility of the notion. They employed such a machine as is used for dyeing cotton cops, in which the liquor is alternately sucked through and forced again through the material. And they convinced themselves that it could not be worked to satisfy their requirements. The outer folds of cloth acted as filters in each direction, preventing the full strength of liquor from reaching the interior. The goods were thus dark at the ends and shaded throughout and nothing they could devise served to obviate this disadvantage. With other material to work on better fortune might conceivably be found. It is unknown, however, that any firm is using a machine of the vacuum type for piece goods.

* * *

An objection made to the dyeing of slubbing and raw stock under pressure is that white places are left in the bulk. Unless exhaustion is very complete, air bubbles remain in odd corners and result in imperfect



dyeing. A simple, cheap and easily understood arrangement is being used now in slubbing dye houses, more especially for mordanting, which is credited with being more effective than a machine relying upon pumps. There are inner and outer wood vats and in the inner the wool is placed. Water surrounds the inner vessel up to its lip. Two steam pipes running longitudinally into the outer space cause the water to boil and constant commotion is caused by the shock of the slopping over at the sides. The steam exhausts into upright pipes at the end of the vessel which fill with water from the outer tank. At their tops these tubes are

bent at right angles to form a mouth. They discharge a foot or so above water level and the steady throw of water from them induces a movement lengthwise. Quite satisfactory results in partial dyeing or mordanting are being obtained. The liquor reaches equally all parts of the mass and the cost of the mechanism need not exceed $150.

* * *

Figures to hand show the average annual earnings of textile workers in Germany in the wool and cotton trades. For the whole empire (1904), the average was $141.20, which may be compared with $110.20 in 1886, since when there has been a steady rise. Silesia is the area of lowest wages, showing an average of $105.40. In the Rhine provinces and Westphalia the highest rate, $160.80, is paid. North Germany comes second with $146.80 and Saxony, Alsace and South Germany go to reduce the average. America is not alone in having a "South."

Since 1891 silk workers' earnings in Germany have improved some 20 per cent. The figures are $131.20 to $158.20. In the linen trade, which includes the hemp, jute and cocoanut fibre branches, wages are better by 50 per cent. than in 1886. The averages are $92.60 and $141. Observations in the engineering trade show that wages in Germany are seriously lower than in either England or France for skilled hands, but for unskilled men there is little to choose between England and Germany, and the points are in favor of the French laborer.

* * *

It is from Huddersfield's Colne Valley that the cheapest tweeds come and makers of similar cloths may be interested to know the rate of pay to unskilled men there. As the result of a strike, card-room hands (teasers and fettlers), wool scourers and dye-house laborers, are to receive $6 per week of 58 hours and 11 cents an hour for overtime. This is at the rate of 10 cents an hour whether by day or by night. The figures may be taken as representative of pay throughout the urban portion of the heavy woolen district.

Careful sheep breeding and careful manipulation of their produce has done a great deal to popularize Argentine wool in Europe. The enterprise of one pastoralist in that country has been shown by the payment of $7,610 for a Leicester ram whose qualities will go to improve Argentine crossbred wool. Five thousand dollars for

a single animal is the best previous price paid in this country and to the same breeder, Mr. Henry Dudding of Riby Grove (Lincolnshire). The Riby champion 1906 has a tuft of wool on his brows which is invaluable in a fly-ridden country. The set of his feet, shape of his face and size of his dewlap are points approved by experts. The fleece is heavy and fine for its breed and the price is unquestionably encouraging to raisers of stud stock.

* * *

On the fringe of the textile trade are a class of manufacturers who minister to the needs of upholsterers. They supply flocks and mungo for beddings and chair stuffing and apparently without always seeing that their materials are clean. A bacteriologist who has been examining samples of pillow flock has found 500,000 colonies of bacteria in a single grain. This imposing rank of figures conveys less to the mind than his statement that about 400,000 colonies is the average in sewage. One sleeps better for the assurance that some flock makers use clean wool and sterilize it regularly by heat at 200° F.

THE SIZING OF COTTON YARN.

BY F. SCARISBRICK.

(A paper read before the British Association of Managers of Textile Works.)

(Continued from August.)

FARINA.

Farina is, as I have previously stated, derived from the potato. Unlike flour, it does not require any preliminary treatment, such as fermenting or steeping. Farina is used chiefly for pure sizing, or for mixing with wheaten flour for the purpose of obtaining certain "feels." It may, however, be used for any class of work, either light or heavy sizing.

Farina has one grave defect, namely, it is liable to lose its adhesiveness on boiling, or this will occur even if it is kept standing for a day or two ready mixed for use. This does not apply to all farinas, as the best qualities will keep in a mixed state, without deteriorating, for a considerably longer time than the poor qualities will. It is generally the Dutch farina that shows this property of weakening.

The reason for this deterioration is generally set down to the fact that farina paste generates acids, which destroy the adhesiveness of the starch on boiling. This is, however, hardly the correct explanation of the trouble. Acidity no doubt has something to do with it, but this is rather the effect than the cause. The true cause is that the starch has been changed by bacterial action, with the formation of acids as the result of the change. This I have proved by experiments I have made, and experiments which Mr. Percy Bean has made independently in his own laboratory.

I have found all samples of farina pastes which show this property of weakening, teeming with active bacterial life when examined under the microscope. It is curious that the starches which show this tendency to weaken are invariably those which have their development underground. Although all farinas show this same tendency, it is (as previously stated) more marked in Dutch farina than German. I believe that the difference is due in a great measure to the water used in the manufacture of the starch in Holland. This is supported by the fact that many makers of farina in Holland are now using distilled water in the manufacture of their starch, and some of the recently imported Dutch farina is as good as the German. Another point to consider is that it is highly probable that the damp soil of Holland affects the starch in its development; and it is also possible that in these circumstances the starch absorbs small quantities of nitrogenous substances from the soil, and thus lends itself to supporting bacterial life to a greater extent than is the case with German-grown farina.

For pure sizing, it is most essential that no risks be taken with the quality of the farina. To avoid such risks, manufacturers will frequently refuse to buy farina unless it is a certain well-known brand. This is carrying the matter to the other extreme, as it means paying more money for such a mark in order to ensure safety; and it is absurd to think that there is only one good brand of farina. There are many such on the market. The deterioration of farina can be stopped in a very simple manner. In conjunction with Mr. Percy Bean, I made a series of experiments some time ago on a practical scale in regard to this matter; and we found that the addition of a small quantity of caustic soda to the farina prevented it from losing strength. This was at first thought to be due to rendering the size slightly alkaline, and thus preventing the action of acids thinning the size when it was boiled. Although this may have some effect in preventing the size being weakened by the boiling process only, we are now of opinion that the cause of weakening on the beam is due to the bacterial action which produces these acids. There is no doubt that the acid still plays a part in liquefying farina size if it be continually boiled; but we are now of opinion that bacterial action is prevented in the presence of free alkali, and until this alkali is completely neutralized the size will keep its strength.

Not only does caustic soda render the size immune from bacterial attacks but the alkali has a marked power of increasing the adhesiveness of the farina. A quart of caustic soda liquor at 70 degrees T., or a 2 cwt. of fa-

rina, will be found sufficient for this purpose.

The best method of using farina is to mix it with the water containing the caustic soda, and the tallow or wax. The mixture is then heated until some of the granules burst. This is done to prevent the starch from settling out when the beck is stopped and to produce a uniform mixing of the ingredients. On no account should farina be subjected to a long boiling before being pumped to the tape-sizing machine. Nothing is gained by such treatment, but there is always danger of the size losing strength. It should also be well dried in the tape-room.

Note: Here I might mention that the microscopic appearance of farina granules is an important indication of its quality. Samples which show a uniformly medium-sized granule invariably give better results than where there is a mixture of very large and very small granules. This I attribute to the difference in the variety of the potato used for making the farina.

SAGO.

Sago is used chiefly for pure sizing, and I believe it stands pre-eminent among the starches for heavily picked pure sized goods and fine counts of yarns if rightly treated. It also imparts a greater strength to the yarn, with a maximum of pliability, than either flour or farina. It has none of the defects of farina, nor does it require weeks of preparation such as is required with flour. It will almost stand an indefinite amount of boiling, and gives improved results with this treatment. This is one of the physical characteristics which I referred to at the beginning of the lecture. While heating until a portion of the granules are burst is sufficient in the case of farina, it is not sufficient for sago. The granules require more than bursting. They require a good boiling and cooking to get the best results, especially where it is used for fine reeds.

Personally I am of opinion that a mixture of three parts sago and one part of farina, with the sage well boiled before the farina is added, will give as good results, and for less money, than can be obtained by using gum tragacanth, spermaceti, castile soap, paraffin wax, and bi-carbonate of soda as a secret preparation for admixture with the starches used for pure sizing. These fancy mixtures are of greater use to the vendors, in the shape of extra profit, than they are to the sizer.

The small amount of caustic soda I mentioned in connection with farina may be employed to advantage with sago. This alkali deepens the color of the size in the case of sago mixings. This is a distinct advantage when sizing Egyptian yarns.

MAIZE.

Maize starch is used chiefly for imparting a hard leathery feel to sized shirtings. It also improves the color of cloth. It is used occasionally for pure sizing. My experience of it for pure sizing does not warrant me in advising its use for such a purpose. It tends to make the yarn too harsh and snappy. For whatever purpose it is used it must be thoroughly boiled, as the outer covering of maize starch granules appears to be of a particularly tough nature. If used for sized goods the best results are obtained by either putting it down with the china clay, chloride of magnesium and water, and boiling the whole together, or putting it down with the flour in the steeping beck.

I have known cases where cloth had a very hard feel and a rough look. The yarn had woven badly and there had been a difficulty in getting a cover. An investigation into the reason for this has shown that when the size had been washed out with water, and a portion of it examined under the microscope, many unbroken maize starch granules were found, showing that the maize had not been properly cooked. At the same time, none of the starch granules of the other starches used in the mixing could be detected by means of the microscope. Seeing that they had all been subjected to the same boiling, I can only consider that this is conclusive evidence that maize starch must be well boiled if the best results are to be obtained from it.

I find that when maize is made into a paste with water it invariably mildews sooner than any of the other starches treated to similar conditions. Maize starch makes a stronger paste than any of the other starches.

TAPIOCA.

Tapioca has never been extensively used in sizing. So far as I know, it has no special merit either for light sizing or for heavy sizing. This year it has been more extensively used than in the past, on account of the high price of farina. Many have used it unknowingly, owing to a number of smart people using it as an adulteration for farina and sago, in order to increase their profits. This has been particularly objectionable when it has been used for adulterating sago, as it is within my personal knowledge that several firms, who are manufacturers of sateens, have suffered in their weaving on account of the loss in strength entailed by using such a weak starch as tapioca where they had been formerly accustomed to using a strong sago size. Tapioca is the most variable starch used in sizing, both for strength and microscopic appearance. There are so many varieties of it one the market that I cannot recommend its use to anyone who desires to obtain uniform results in sizing. Better results can be obtained at the same cost from sago or maize.

Tapioca is similar to farina in its tendency to lose strength by prolonged boiling, or by being kept mixed too long before using.

It is interesting to note that the two starches liable to lose strength are both developed under-ground, one from a tuber (farina), and the other from a root (tapioca), and that those starches which show no liability to lose strength are developed above ground in the seeds, as in wheat and maize, or in the pith of the plant, as in sago.

RICE FLOUR.

Rice flour is not often used in sizing. It is chiefly employed to give a sharp, crisp "feel" to certain classes of shirtings. Why some people require cotton cloth to possess a "feel" which is entirely foreign to it is a thing which I never could understand.

Rice is without doubt the worst weaving starch used in sizing, and in respect to the toughness of its granules it beats maize. If it is at all possible to obtain satisfactory results without rice it is better to abstain from the use of it, as the harsh, wiry "feel" is anything but conducive to good weaving Where it is necessary to use it, the best results may be obtained by putting it in the clay pan with the china clay, and the necessary amount of water, and boiling the whole up together.

The granules of rice are the smallest of any of the starches used in sizing. The following is the order in which the various granules of starch rank for size: Farina, sago, wheat, maize, tapioca, and rice.

(To be continued.)

STANDARD WAGE LIST FOR CARD ROOM OPERATIVES.

In the July and August issues we gave accounts of the standard wage lists as applied in Lancashire for the payment of weavers and spinners. This month we give the English list for card and blowing room operatives:

REVOLVING FLAT CARDS.

(1) 550 to 750 lbs. per card, 48 cents per card. Below 550 lbs. 1 cent per card to be deducted for every 50 lbs. less and down to 300 lbs., beyond which no deduction shall be made. Above 750 lbs. 1 cent per card for every 50 lbs. to be added up to 1,000 lbs., beyond which no further addition. Minimum price, 43 cents. Maximum price, 53 cents.

(2) Weight carded to be based on hanks produced by slubbers. Four weeks to be taken in case a test is required. Full weeks preferred.

(3) Four strippings per day, or 22 strippings per week (55 1/2 hours). If any variation from 4 strippings, 20 cents per man per week per stripping to be added or deducted. Where slow stripping motion is used 2 strippings per day to be the basis. Variation (as before).

(4) Grinding through up to 1 1/2 times per fortnight.

(5) Mill having no lap bogeys (trucks), 2 cents per card extra to be paid. With bogeys, 2 cents to come off. For carrying laps up 4 steps, no extra. Up to 12 steps 2 cents per card extra. More than 12 steps, case for adjudication.

(6) Where no under-carder is employed, grinders assist to do under-carder's work, and 4 cents per card is added to price. This

applies to firms having not more than five preparations.

(7) Grinders to brush down cards twice a day in fine mills and once in other mills; to oil and clean cards as usual; sweep off and gather fly, strip doffers, carry laps, piece bands and straps on cards; each week sweep down their proportion of drums and shafting. Clear all waste from preparation; twice a year to scour through drawing frames; other frames, once a year; extra scouring 12 cents per hour per man.

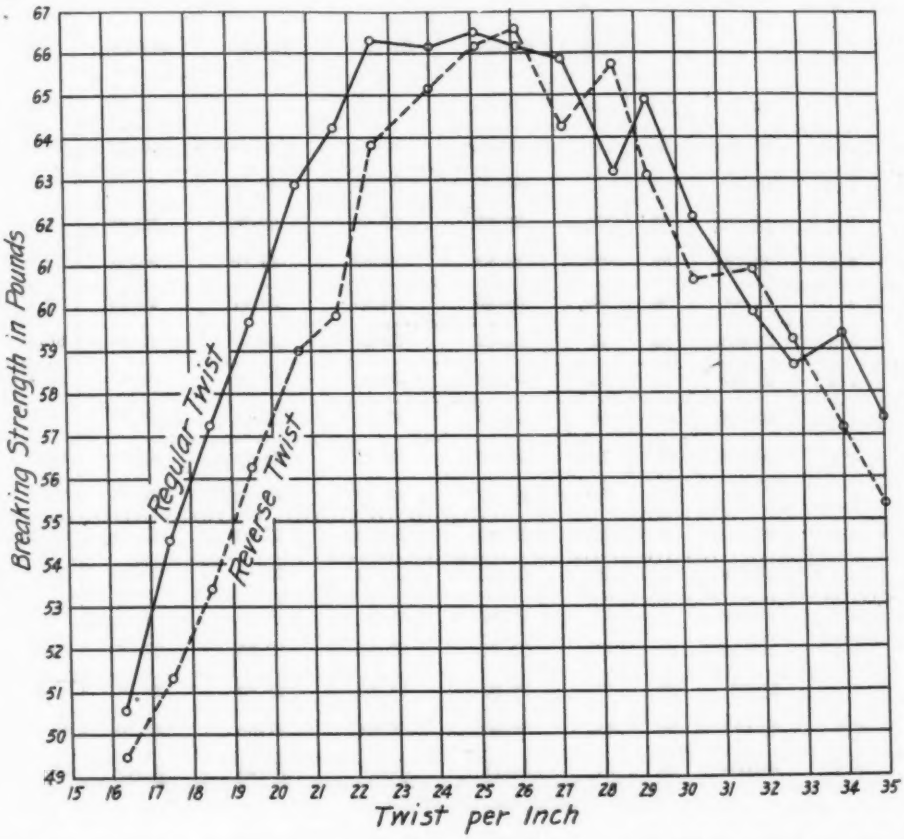
(8) When grinder absents himself from work and others do his work, 90 per cent. of his pay to them.

The value of the textile machinery exported from Great Britain for the five months ending May 31, was, in round numbers, $13,000,000 as compared with $9,000,000 last year.

THE EFFECTS OF TWIST ON THE BREAKING STRENGTH OF YARN.

BY B. M. PARKER.
Assistant Professor of Textiles, West Raleigh, N. C.

Since cotton yarn is used for so many purposes, we find varying amounts of twist used. We all know that a yarn twisted too hard becomes brittle and the strength decreases, also that filling yarn, on account of having a small amount of twist, is not as strong as warp yarn which has more twist. It is also claimed that yarn with reverse twist, that is with the spindles running in opposite direction to the hands of a watch, is of greater strength than yarn with regular twist. In order to test this thoroughly several tests were carried on at different times and on different sizes of yarn. The one tabulated below is the most complete and bear-



ing out the results obtained by the other tests formerly made.

In a previous article the question of humidity was considered, the results showing that a humidity of 65 to 75 per cent. gave the best results, so with this in mind, the humidity during all the tests was kept between these figures.

Twist multipliers were used running from 3 to 6.4, increasing .2 for each test, giving a total variation in twist from 16 to 35 turns per inch.

It was found that the yarn was strongest when using 4.6 as twist multiplier, or 25 turns per inch twist, the ends staying up well. On the lower twists the yarn became so

Test.	Twist Multiplier	Twist.	Gear.	Front Roll Speed.	Weights.		Counts.		Breaking Strength.	
					Regular.	Reverse.	Regular.	Reverse.	Reg.	Rev.
1	3	16.41	31	124	32.28	33.65	31.06	29.76	50.6	49.6
2	3.2	17.504	29	116	33.87	33.15	29.59	30.21	54.5	51.4
3	3.4	18.598	28	112	33.79	33.90	29.67	29.50	57.3	53.5
4	3.6	16.692	26	104	33.60	32.89	29.76	30.49	59.7	56.2
5	3.8	20.786	25	100	33.63	32.53	29.76	30.77	62.9	58.9
6	4	21.88	23	93	34.06	33.65	29.41	29.76	62.4	59.7
7	4.2	22.974	42	87	34.42	32.21	29.07	31.06	66.4	63.7
8	4.4	24.068	41	84	34.58	33.46	28.99	29.94	66.1	65.1
9	4.6	25.162	39	80	34.23	33.88	29.24	29.59	66.7	66.3
10	4 8	26.256	38	78	34.86	33.31	28.74	30.03	66.3	66.5
11	5	27.35	36	74	34.71	33.66	28.82	29.76	65.8	64.2
12	5.2	28.444	35	72	35.86	34.29	27.93	29.24	63.2	65.7
13	5.4	29.538	34	70	35.20	34.70	28.41	28.82	64.6	63.1
14	5.6	30.662	33	67	35.53	34.37	28.17	29.15	62.1	60.4
15	5.8	31.726	31	63	35.61	35.40	28.09	28.25	60.2	60.9
16	6	32.82	30	61	36.25	35.70	27.62	28.01	58.5	59.2
17	6.2	33.914	29	59	36.33	36.02	27.55	27.78	59.7	57.6
18	6.4	35.008	28	57	36.77	36.30	27.25	27.55	57.4	55.3

Table showing the twist per inch, twist multiplier, the weight, count and breaking strength of both reverse and regular twist in each test.

Throughout all tests the humidity was kept near 70% never above 75 nor below 65.

Before the tests were begun, the frame was well cleaned and oiled, new bands were put on with a uniform tension of three pounds, also new top rolls, so as to have the frame in as good running order as possible. Eighteen tests were made all from the roving, forty ends up on the frame, twenty with reverse twist and twenty with regular twist. Ten bobbins were selected from both twists and tested for the breaking strength.

weak it was necessary to put on lighter travelers and even then it was almost impossible to keep all the ends up. On the higher twists the yarn did not run as well as when using the average twist.

The accompanying table shows the results of the eighteen tests, only the average breaking strengths in each case being given.

To bring out more clearly the results of the tests, curves were plotted showing the

breaking strengths and the corresponding twists. The chart shows clearly the manner in which the breaking strength increased and decreased. The breaking strength reached its highest point with regular twist in test 9, using a twist multiplier of 4.6 giving 25.162 turns of twist. With the reverse twist the highest point was reached with a twist multiplier of 4.8 giving 26.25 turns twist.

Another fact brought out was that the tests on reverse twist, in almost every case, show a lower breaking strength than with regular twist. Another fact not accounted for was that the curves were not smooth, that part of both showing the decrease in the breaking strength showing considerable variation from a smooth curve.

It will also be noticed that the yarn spun with the highest twists are heavier. As the roving was the same throughout all the tests and the humidity nearly the same, it can be accounted for in only one way. The extra twist caused the yarn to shrink in length on account of the greater contraction while being spun.

TOP ROLL COVERING.

BY A. FITTER.

Since the invention of the water frame by Richard Arkwright many substances have been used to cover the top rolls of yarn preparatory machinery, but none have been so generally adopted as woolen cloth and sheep skin. This skin is especially suitable for roll covering on account of its elasticity, toughness and regular surface, which is capable of gripping the sliver and at the same time yielding enough to prevent damage to the fibres. Great care should be taken in the selection of the cloth and skins for covering the rolls; poor material and indifferent work mean poor yarn and unnecessary waste. The grain side of the leather should be smooth, firm and pliable to the touch. The inner side should have a fine nap and the same feel as a kid glove. When stretched between the hands and examined with a magnifying glass there should be no cracks or abrasions. Skins should be bought by measurement, that is, so many inches long and so many inches wide for a given price. The skin should be measured from end to end at the shortest point and from side to side at the narrowest place. In this way the buyer can estimate the number of cuts he can get from each skin. In no case should the neck be measured as it is not suitable for covering rolls.

When a lot of skins come to the coverer they should be examined for defects, such as knife cuts, overshaving or undershaving. Undershaving can be noticed if forty or more skins are piled on top of one another in the same direction, for they will be thicker over the spine than on the sides. If any hairs are found adhering to the skins they should be rejected as this is a serious defect.

Of course the cheapest skins are those from which the largest number of cuts can be taken, yet the buyer should not insist on very large skins and at the same time very thin ones as they will not last so long as the smaller skins. Low priced skins are used for heavy numbers, the medium priecd ones for lighter numbers, and the highest priced for the finest numbers. They are again sorted with the larger skins for drawing and slubbing, the medium skins for intermediate and roving frames and the small skins for the spinning frames and mules.

Another point to consider in buying skins is the color. American skins are generally of a dark cream color; English skins are of a light brown, while some are red. Some spinners prefer the red because they can see the yarn coming from the rolls better, but this is not important as after a few days the skin loses its red color. Still another point is the selection of the cloth that goes under the skin. Heavier cloth should be put on rolls for drawing and slubbing than on fine spinning frames. The cloth should be of the best quality of wool, well carded, so that every foreign substance is removed and as near as possible of a uniform thickness. Good leather is often condemned and wasted on account of poor cloth.

Some mills send out their rolls to be covered and it would be a good plan for such mills to slash these rolls "cloth and leather" with a knife before sending them out and so prevent the coverer from using the same cloth again.

Before covering the roll care should be

taken that the roll is perfectly clean and neither hot nor cold, but merely warm. The cloth is cut in strips a little narrower than the boss of the roll and laid flat on a table. A glue composed of equal parts of glue and isinglass dissolved separately in water and then mixed is used to cover the boss of the roll. The boss is then placed on the strip of cloth and turned round with the cloth until it begins to overlap when it is cut off with a sharp knife and the seam pressed in place with the fingers. After covering the other boss in the same way the roll is put into the smoothing rolls so as to smooth out any lumps that may have been in the glue, then put on the skins in the same way as the cloth. All roll cloth is not the same weight and as the rolls are covered so as to give a cushion effect, the heavier cloth should be used for the heavier drawings, a lighter cloth for the intermediate and a still lighter one for fine frames and spinning.

The skins are cut in strips a little wider than the boss of the roll so as to allow for burning off the ends, and just long enough to go around the roll; both edges are beveled so as to make a joint that is not perceptible to the touch. For this purpose a beveling machine is perferable although it is often done by hand. The edges are cemented and then joined together and then placed in a press to form a perfect joint. Then the cot is drawn over the boss of the roll as a glove would be drawn on the hand. The edges are then burned by placing the end of the roll against a pulley or wheel of hard wood running at a high rate of speed.

The piecings on both bosses should run in the same direction so as to avoid breaking the joints when put in the machine. Both bosses must also be covered with the same weight of cloth and the same thickness of leather or they will not be parallel. This will cause uneven drawing of the sliver on account of the tendency of the boss with the lighter covering to drag behind; it would also impair the life of the roll with the lighter end. A gauge should be used to determine whether both bosses are of the same diameter, and this gauge should be in the form of a collar that will fit tightly when the boss is drawn through it.

The top roll must not be covered to bring it to the same diameter as the bottom roll as in this case the bottom rolls will soon become fluted and will not draw evenly. The top roll should be slightly larger or smaller than the bottom roll, preferably smaller.

Some mills prefer to use calf skin for their slubber and drawing frame rolls; others grind off the grain of the leather in order to make the roll true and then the roll is varnished to reproduce the grain. This is not a good plan and it would be better to take a little more time and care in covering the roll well in the first place than to try to remedy the defect in this manner. Another way to cover rolls is to cut the leather into strips from one to one and a half inches wide and wind it around the roll with the same tension on every part. The advantage of this method is longer wear and less liability to slip. The disadvantage is extra cost and if special pains are not taken the roll is likely to be out of true.

THE CORD KNOTTER ON THE SELF BINDING HARVESTER.

BY EDWIN J. PRINDLE.

(From a paper read at the A. I. E. E. Convention, Milwaukee.)

A most interesting example of the evolution of an invention is that of the cord-knotter of the self-binding harvester. The problem here was to devise a mechanism which would take the place of the human hands in tying a knot in a cord whose ends had been brought together around a bundle of grain mechanically. The first step was to select the knot which could be tied by the simplest motion. The knot which the inventor selected is that shown in Fig. 7, and is a form of bow-knot. The problem was to find how this knot could be tied with the smallest number of fingers, making the smallest number of simple movements. As anyone would ordinarily tie even this simple knot, the movements would be so numerous and complex as to seem impossible of performance by mechanism. The inventor, by study of his problem, found that this knot could be tied by the use of only two fingers of one hand, and by very simple movements.

The knot will best be understood by following the motions of these fingers in tying the knot. Using the first and second fingers

of the right hand, they are first swept outward and backward in a circular path against the two strands of the cord to be tied, as shown in Fig. 1. The fingers continue in their circular motion backward, so that the strands of the cord are wrapped around these fingers, as shown in Fig. 2. Continuing their circular motion, the fingers approach the strands of the cord between the twisted portion and a part of the machine which holds the ends of the cord, and the fingers spread apart as shown in Fig. 3, so that they can pass over and grasp the strands thus approached, as shown in Fig. 4. The fingers then draw back through the loop which has been formed about them, the fingers holding the grasped portion of the strands, as shown in Fig. 5. The knot is finished by the completion of the retracting movement of the fingers through the loop, thus forming the bow of the knot as shown in Fig. 6.

FIG. 1. FIG. 2. FIG. 3.

The inventor found that one finger could have a purely rotary movement, as if it were fixed on the arm and unable to move independently of the arm, and the movement being as if the arm rotated like a shaft, but the second finger must be further capable of moving toward and from the first finger to perform the opening movement of Fig. 3, and the closing movement of Fig. 4 by which it grasps the cord. The inventor accordingly, from his exhaustive analysis of his problem, and his invention or discovery of the proper finger motions, had further only to devise the very simple mechanical device illustrated in Fig. 8 to replace his fingers.

The index finger of the hand is represented by the finger S, which is integral with the shaft V. The second finger of the hand is represented by the finger U, which is pivoted to the first finger by the pin S. The grasping movement of the finger U is accomplished by a spring V^1 bearing on the shank U^1, and its opening movement is caused by the travel of an anti-friction roll U^2, on the rear end of the pivoted finger, over a cam V^2, on the bearing

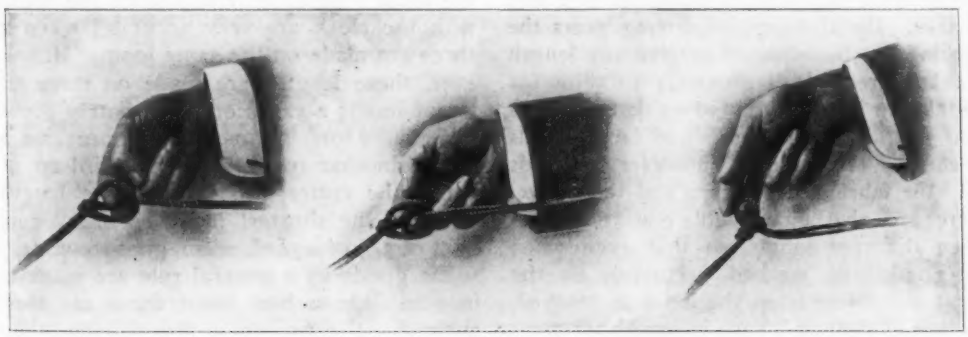


FIG 4. FIG. 5. FIG. 6

of the shaft. The shaft is rotated by the turning of a bevel pinion, W, on the shaft through the action of an intermittent gear.

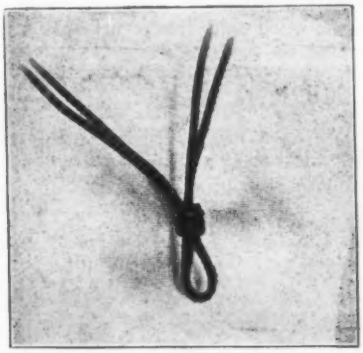


FIG. 7.

The necessity of drawing the fingers backward to accomplish the movement between Figs. 4 and 6 was avoided by causing the tied bundle to have a motion away from the fingers as it is expelled from the machine, the relative motion between the fingers and the knot being the same as if the fingers drew back.

CUT MARKS.

BY WM. PICKWICK.

In making cotton warps the slasher is usually provided with a marking box and brushes. By a change of driving gears the machine can be adjusted to give any length of cut desired. It is necessary to allow for the take-up in weaving, and on cotton goods from 51 to 52 yards is required for 50 yards of cloth. The take-up, however, depends upon the fabric, size of yarn and the weave. There are also unavoidable variations between different looms, so that even when the goods are marked accurately on the warps and taken from the loom as marked, the cuts of cloth will vary in length.

To make a cut mark that will be visible after weaving, I would suggest the use of Diamond dyes, as anyone can prepare them. Use cold water if a fast color is not wanted. For more durable marks boiling water should be used. I have used red chalk dissolved in water with good results. Bluing such as is used in laundries may also be used on certain kinds of goods.

When making blankets it is necessary to have the cuts measure exactly right. A good method that had been in use in one mill in which I worked consisted in passing a piece of tape equal to the length of the blanket around the warp beam and over a pulley attached to the arch of the loom. The tape was drawn tight by a spring or weight. By this arrangement the tension on the tape remained uniform, regardless of the size of the beam. Tapes of equal length were put on the looms, and I found that we got the length within a variation of one to two inches.

I am now working on silk tie goods, dress goods and mufflers. We use a clock for measuring the dress goods. The dial of the clock is a gear driven by a worm gear. At the end of the worm gear shaft is a pinion gear which connects with the gear on the loom. As the cloth is woven the length is indicated by a hand on the dial, which will register to 100 yards. I find that even with the greatest care there will be a variation of a yard, sometimes more, in 50.

In our tie goods there are generally three different sizes of flower used in a cut. The cut may be 60 yards long, with 20 yards to each pattern. The pattern may be the same in the three divisions, or may be made with three different weaves, but they must be of the same length. For this work the results with the clock are very accurate, when all three are made on the same loom. If, however, these lengths are made on three different looms a variation immediately occurs and causes loss. If one pattern measures 20 yards, another 19 1/2, and the third 20 1/4 yards, the cutter must cut all the lengths equal to the shortest piece, leaving a remnant of 3/4 of a yard, which goes to waste.

Tie goods as a general rule are made up in sets. On a box loom there are three sizes of patterns; on a swivel loom there would be three different colors. For example, the first 20 yards would be blue, the next 20 red, and the next 20 green. The cutter wants to get the same number of ties from each piece.

These ties are sold in dozens or half dozens by wholesale, one dozen or half dozen to each pattern. This will explain why the remnant would cause a loss.

Questions and Answers.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

For reply to questions that are not of general interest to readers of textile journals, such as those relating to the composition of yarns, analysis of fabrics, etc., we will charge the enquirer with the cost of the investigation.

Numbering Sewing Cotton.

In response to our enquiries we have received from Matthew Blair, of the well known firm, McLennan, Blair & Co., Glasgow, Scotland, the following interesting account of the development of the present standard for numbering Paisley thread:

When the present method of numbering was adopted, the thread was all three-cord.

The count given was that of the single thread out of which the three cord was made, thus:

Thread Numbers 10, 20, 30, 40, 50, etc., were made out of three strands of single yarn "Cotton Count" 10, 20, 30, 40, 50, etc.

But when the thread came to be made six-cord, the thread numbers were retained, although it was now in every case made with a single yarn twice as fine as before. Therefore at present, Thread Numbers of six-cord 10, 20, 30, 40, 50, etc., are made from six strands of single yarn "Cotton Count," 20, 40, 60, 80, 100, etc.

The cotton count used for thread is the same as used for cotton yarn, indicating the number of 840-yard hanks per pound.

Fine Ends on the Apperley Feed.

Editor Textile World Record:

I am having trouble with the side ends cutting fine on the finisher of a card that is equipped with an Apperley feed. Can you suggest any remedy?

Bunker (731).

There are many things that cause the outside strands to be fine at times. I would advise Bunker to take out the doffers and give them a good light grinding. Then I should give them a good brushing with a hand card covered with wool. Grind all day if necessary, or until they are perfectly true. Perhaps the waste ring is a trifle higher than the others. In that case I should move the outside or waste ring out 1/16 or 1/8 of an inch so the ring next to it on the other doffer would deliver heavier roving. The spare ring may steal from the ring next to it. When I had trouble with the outside end being fine I used to take out the packing of the spare or waste ring and move it out 1/16 or 1/8 and that would bring up the outside strands to their proper size. I should incline the overhead drawing on the side that was fine.

Sam Driver.

London Shrunk.

Editor Textile World Record:

Will you give me some information regarding the process of shrinkage known as "London shrunk?"

P. A. Scoag (720).

The following account of the London process of shrinkage for woolen goods was written by James Strand some time ago for the Textile World Record:

"The recognized procedure is to fold dry cloth between upper and lower layers of wet cloth, to dry the cloth by natural means and subsequently to give cold hydraulic pressure. Some minor variations are made. A closely woven cloth which has been well fulled and shrunk at the mills and comes bone-dry from the hot press is not treated with much moisture. Its enclosing wrappers are not so damp that they do much more than supply the normal regain of 12 1/2 per cent. of moisture that dry wool naturally absorbs. Such a piece is encouraged to shrink but little in width and length. The chief purpose is to be rid of the glaze and the harshness and to substitute a pure, soft handle and a somewhat deader appearance.

"To suit some fabrics and some customers, the shrinkers find it necessary to use hot pressing at times. It is certainly the case that the exact procedure is not stereotyped, even at any one shrinker's works. Some fabrics are given a more thorough wetting and are dried by circulation in a specially ventilated chamber. One shrinker is said to replace the use of water by low-pressure steam. When it happens that goods in no need of shrinking are sent, it is rumored that the shrinker's stamp and tickets are placed on pieces that have merely been opened out and cramped in a cold press. But merchants are able, by comparing the dimensions before and after, to see how much the process has done to fill up the cloths. Sometimes the loss of length and width is considerable and at other times quite slight.

"The average charge for London shrinking is one penny per yard of 6/4 width or, more precisely, $2.16 per 100 yards. The process has its undoubted uses, though in some quarters it is exalted as a fetish."

Determining the Number of Square Rubber Thread.

Editor Textile World Record:

How is square rubber thread numbered, and how can the number be determined from a sample?

G. Leeson (725).

The number of square rubber thread indicates the size in a fraction of an inch. Thus No. 40 thread is 1/40 inch square. The numbers decrease as the sizes grow larger, No. 20 thread being 1/20 inch square or twice the size of No. 40. The thread used in elastic fabrics varies in size from 20s to 60s. Some rubber thread manufacturers decline to make thread finer than 60s because of the difficulty in producing a thread that will give ordinary satisfaction.

The specific gravity of vulcanized rubber, such as is used for rubber thread, is somewhat less than that of water and is placed by the best authorities at .92. The specific gravity of rubber varies slightly in different lots, but the variation is negligible in textile practice. The number, indicating the size of the thread, bears, therefore, a definite relation to the length and weight. The specific gravity being .92, it follows that:

920 ounces rubber=1 cubit foot (1728 inches.)

1 pound rubber=5/6 yard rubber thread 1 inch square (30 cubic inches).

(1) The length of a thread of rubber or any other material per pound is in inverse proportion to the area (square of one side) of a cross section of the thread. Thus No. 1 rubber thread, with a sectional area of 1 square inch, measures 5/6 yard per pound, No. 2 thread measuring 1/2 inch square and with a sectional area of 1/4 square inch will measure 3 1/3 yards or four times as great a length per pound as No. 1 thread.

As the number of rubber thread indicates the size of one side in a fraction of an inch the square of the number indicates the sectional area in a fraction of a square inch. Thus No. 2 thread is 1/2 inch square and has a sectional area of 1/4 square inch ($2 \times 2 = 4$).

(2) The sectional area varies in inverse proportion to the square of the number.

(3) It follows from the above propositions 1 and 2 that the length of rubber thread per pound or other unit of weight varies in direct proportion to the square of the number. Thus No. 4 thread (square 16) will have four times as many yards per pound as No. 2 thread (square 4).

We have already found that No. 1 thread measures 5/6 yard per pound. From proposition 3 we have

No. 1 thread = 5\6 yards per pound.
No. 2 thread = $3\frac{1}{3}$ yards per pound ($4 \times \frac{5}{6}$)
No. 3 thread = $7\frac{1}{2}$ yards per pound ($9 \times \frac{5}{6}$)
No. 4 thread = $13\frac{1}{3}$ yards per pound ($16 \times \frac{5}{6}$)
No. 5 thread = $20\frac{5}{6}$ yards per pound ($25 \times \frac{5}{6}$)
No. 6 thread = 30 yards per pound ($36 \times \frac{5}{6}$)

This table shows that the square of the yards per pound is equal to five-sixths of the square of the thread number. Also that the square of the thread number is equal to one-fifth more than the yards per pound. From this we have:

Yds. per lb. = $\frac{5}{6} \times$ square of No.

Thread No. = square root of (yds. per lb. $\times 1\frac{1}{5}$)

The following examples illustrate the application of these formulas.

Ex. Find yards per pound of No. 40 rubber thread.

$40 \times 40 = 1600$.

$1600 \times \frac{5}{6} = 1333$ yards per pound.

Ex. A sample of rubber thread measures 750 yards per pound. Find number.

$750 \times 1\frac{1}{5} = 900$.

Square root of 900 = 30, Thread No.

Ex. A rubber warp for an elastic fabric has 440 ends of No. 36 rubber and is 66 yards long. Find the weight.

$(36 \times 36) \times \frac{5}{6} = 1080$ yds. No. 36 per lb.

440 (ends) × 66 (yds.) = 29040 yds.

29040 (yds.) ÷ 1080 (yds. per lb.) = $26\frac{7}{9}$ lbs. wt. of wp.

Ex. A rubber warp for an elastic fabric has 88 ends, is 67 yards long, and weighs 4 3/8 lbs. Find the thread number.

88 (ends) × 67 (yds.) = 5896 yards.

5896 (yds.) ÷ $4\frac{3}{8}$ (lbs.) = 1347.

$1347 \times 1\frac{1}{5} = 1616$.

Square root of 1616 = 40, Thread No.

Ex. In analyzing a sample of elastic webbing 20 ends of rubber when raveled are found to measure each 1 7/16 inches in length and to weigh 2.7 grains. Find the thread number.

20 (E) × $1\frac{7}{16}$ (in. = $28\frac{4}{7}$ inches.

2.7 grains = $28\frac{4}{7}$ inches.

1 lb. (7000 gr.) = 2070 yards.

Sq. root ($2070 \times 1\frac{1}{5}$) = 50, Thread No.

In calculating the size of rubber thread allowance must be made for change in length caused by the tension under which the thread is held in the fabric, also for change in weight due to absorption by the surrounding textile materials. No fixed rule can be laid down for such allowance, as the losses vary with different conditions. Experience and good judgment are necessary in deciding on what to allow for them.

The size of rubber thread can also be determined by a gauge similar to that used for wire. Allowance must be made for changes in length and weight.

Perforated Paper Tubes for Dyeing.

Editor Textile World Record:

Where can I obtain perforated paper tubes such as are used in dyeing machines for yarn and roving? I understand that they are made of a paper specially prepared to resist the action of the dye liquor. Giro-Conto (738).

Emil Adolff, Reutlingen, Germany, informs us that he manufactures such tubes as Giro-Conto requires. He has sent us a number of samples of his goods, including short, cylindrical and conical tubes. They can be seen at our Boston office.

Strengthening Fibres.

Editor Textile World Record:

Can you refer me to any books that have been published on the subject of strengthening fibres? I refer to claims that have been made that by treatment of fibres the original strength cannot only be retained, but increased. I am somewhat doubtful about the last part of this proposition, although I can see that fibres may be treated in such a way as to arrest the usual deterioration caused by atmospheric conditions and prevent the natural retting that may be going on in retted fibres such as jute, hemp, etc. Detroit (716).

It may be said in general terms that no processes have been devised, as far as the writer knows, which have for their direct object, the increasing of the strength of such raw fibres as jute, flax, etc., other than stiffening processes when the filament is "loaded," but which are not to the point.

All flax manufacturers know that the more carefully and evenly the fibre is spun, especially if hard twisted, the stronger, proportionately, will be the yarn or thread; and where sizing is employed, additional strength is gained. There are, however, indirect methods of strengthening the fibre itself, the most common process being known as mercerization, which is an old story to those readers of this journal who are interested in cotton.

There seems to be very little recorded in relation to the mercerization of other fibres than cotton, though it is said that jute is made finer, softer and very much more durable by treatment with concentrated lyes, caustic potash or soda, or both.

Paper has been toughened by a process of parchmentization through the use of a one or two per cent. solution of sulphuric acid, one use to which it is adapted being the toughening of the centres of the circular sheets of paper used for filtering chemicals, etc. Vulcanizing is also accomplished by the use of zinc chloride, but the process is not suitable for raw fibres. None of these processes should be used without expert knowledge.

Charles Richards Dodge.

Glue for Iron Rolls.

Editor Textile World Record:

Please give me a receipt for glue for iron rollers. I am having considerable trouble to make the leathers stay on the rolls with the glue I am using. Norfolk (686).

First wash the roll with ammonia, then after wiping it dry put on a coating of sulphuric acid. Rinse off the acid with cold water and wipe perfectly dry, then allow the roll to stand for awhile until it is absolutely certain that there is no moisture on the part to be covered. Next apply a thin coating of fish glue to the surface of the roll and also to the covering with a short, stiff brush. Put it on as lightly and quickly as possible, but be sure that every part of the two surfaces is evenly covered with the glue. Then draw the covering on as tight as possible and allow it to stand for several hours that the glue may have time to set; the roll is now ready for use. The greatest care should be used in cleaning the surface of the roll, for if any grease remains the glue will not adhere; when the acid is rinsed off the grease will come off with it.

I have tried several kinds of glue and cement, but I find that Le Page's gives as good satisfaction as any. It has one good point in that it is always ready to use. I have covered mule frictions in the manner described and with the best results, the leather adhering firmly to the iron until it is worn out. One thing I would mention in connection with this glue is that the less used the better the result. Of course both surfaces must be thoroughly and evenly covered, but with as light a coating as it is possible to put on. The glue must not be thinned with water or anything else; if it is too thick stand the can in a pail of hot water until the glue is of the right consistency to spread quickly. A. F. P.

Gauges for Rubber Thread.

Editor Textile World Record:

Where can I obtain a gauge such as is used to determine the size of rubber thread?

Kutscher (719).

Gauges for rubber thread can be obtained from the Brown & Sharpe Mfg. Co., Providence, R. I. They make a special oblong gauge for this purpose similar to the gauge used for rolling mill work. Some of their rubber gauges have been made with a range of 14 to 60, others with a range of 16 to 54, each number representing a part of an inch.

Cause of Difference Between Two Elastic Fabrics.

Editor Textile World Record:

We wish to thank you for your analysis of the two elastic fabrics in your August issue, which has helped us very much.

Henry Barnes.

Analysis of Carpets.

Editor Textile World Record:

I would like to see you apply the straight line method of analysis to carpet fabrics.

Tapestry (741).

In reply to this question we obtained from one of our leading carpet mills a sample of tapestry carpet, shown at Fig. 1. A sample of 1/300 square

FIG. 1. TAPESTRY CARPET.

yard (2.4 in. × 1.8 in.) was cut with the straight line die shown at Fig. 2. It weighed 50.6 grains. The threads in this sample were then raveled, counted and weighed separately with the following result:

Warp:

57	E. Worsted	in 2.4 in.	23¾ E per in. 13
38	E. Cotton	in 2.4 in.	15.8 E per in. 6.8
57	E. Jute	in 2.4 in.	23¾ E per in. 20.4

Filling:

36	P. Jute	in 1.8 in.	20 P per in. 10.4

Total, 50.6 gr.

The weight of the carpet is found as follows:

50.6 gr. per $\frac{1}{300}$ sq. yd.=50.6 ozs. per yd. 52½" wide.
(50.6 ozs. × 27 in.) ÷ 52.5 in.=26 ozs. per ¾ yd.

The take-up of the yarn is next determined.

The worsted pile warp raveled from a sample 22 1/2 in. long measures 51 inches, a take-up of 56 per cent.

The cotton ground warp raveled from 22 1/2 in. of cloth measures 27 1/8 inches, a take-up of 17 per cent.

No difference is found between the woven and raveled lengths of either the jute stuffer warp or the filling. These two are heavily sized, however, and upon scouring and drying show the following results:

20.4 grains jute warp.
16.7 grains scoured.

3.7 grains loss, 18%.

10.4 grains jute filling.
9.4 grains scoured.

1. loss, 10%.

FIG. 2. STRAIGHT LINE DIE.

The spun counts of the various materials are calculated as follows:

Worsted warp:
23¾ (E) ÷ 13 (grs.) = 1.83 Cott. No.
Add one-half = 2.74 Wors. No.

Allow for take-up:
2.74 (No.) ÷ .44 (yield) = 6.2. Wors. No.
= 2/12.4s Wors.

Cotton Warp:
15.8 (E) ÷ 6.8 (gr.) = 2.32 Cott. No.

Allow for take-up:
2.32 (No.) ÷ .83 (yield) = 2.8 Cott. No.
= 3/8.4s Cott.

Jute warp:
23¾ (E) ÷ 20.4 (gr.) = 1.16 Cott. No.
17.14 (constant) ÷ 1.16 = 14.8 lb. Jute.

Allow for sizing:
14.8 (lb. Jute) × .82 (yield) = 12.1 lb. Jute

Jute filling:
20 (P) ÷ 10.4 (gr.) = 1.92 Cott. No.
17.14 (constant) ÷ 1.92 = 8.9 lb. Jute.

Allow for sizing:
8.9 (lb. Jute) × .90 (yield) = 8 lb. Jute.

Summarizing the results we have:

Warp: 23¾ ends 2/12s worsted, pile.
15⅝ ends 3/8s cotton, ground.
23¾ ends 12 lb. jute, stuffer.
Filling: 20 picks 8 lb. jute.
Weight of goods, 26 ozs. per ¾ yard.

The "pound" standard used here for the jute yarn indicates the weight in pounds of 14,400 yards.

KNITTING DEPARTMENT.

For Knitting Mill Machinery, Equipment and Supplies, see pages 236 to 253. Also Buyers' Index.

THE KNIT GOODS SITUATION.

The recent decline in the price of cotton has caused buyers to go slow in placing duplicate orders, although among the better informed there is no fear of any great slump in the price of manufactured goods. So far there has been no change made in prices by manufacturers as the decline in cotton has come too late to be of any benefit in making fall goods, and there are none of them anxious enough for spring business to make any material changes in their prices.

Early spring business placed is considerably larger this year than in any former year, and, as a consequence, this condition counteracts any weakness in the raw material market. There is scarcely a manufacturer who is not in such a well sold-up condition that he can afford to wait until buyers must place their duplicate orders, and when he can do this of course it will not be necessary for him to lower his price.

The situation on men's fleeced goods remains strong. Few manufacturers are in a position to accept any business at all, and those who are open for business are asking $3.75 for standard weight goods and are only taking orders for very late deliveries, say November and December.

The demand for men's ribbed goods is decidedly acute at the present time owing to the fact that two manufacturers of this class of goods have suspended operations. Some lines may be had as low as $3.75, but the better ones are being held at $3.87 1/2, and it is claimed that they show little profit at that owing to the high prices at which yarns are held.

Another very serious problem confronting the manufacturers today is the scarcity of labor and consequent inability to get out full production. Several manufacturers claim that the shortage of help during July and August has had the effect of cutting down their output from 15 to 25 per cent.

Additional lines of men's buttonless and sleeveless shirts are being shown for spring delivery, and the indications are that the sales on garments of this description will be increased considerably another season. It is noticed that some manufacturers are showing men's combination suits made sleeveless, knee length, and with drop seats. This, in our judgment, represents the most comfortable underwear for men, and we predict a steadily increasing demand for goods so made.

A talk with many retailers shows that the nainsook shirts and drawers have cut into the business on knit garments to a considerable degree during the season just past. However, a satisfactory combination suit cannot be made from a woven fabric as it lacks the elasticity necessary to make it fit.

A few new features are shown in the line of summer underwear for 1907. One is a ladies' combination suit made by the Julius Hirsch Knitting Co. of Philadelphia, in which the maker has endeavored to overcome an objection often raised on garments trimmed with the ordinary edging. The objection has been that the shoulder straps slip off, while in the Hirsch garment the armsizes are trimmed with an English everlasting cotton lace trimming sewed on to slant toward the neck and has the effect of running well upon the shoulder.

Fancy knit goods manufacturers are having good business on some new lines brought out this season, principally on jackets or coats for men and women. The men's coats are made almost entirely in the plain cardigan stitch with lapels, and are made large and somewhat loose fitting. The women's garments are called "pony coats" and are mostly taken in white with light blue trimming. They are made in a variety of fancy stitches in grades to retail at from $3.00 to $5.00 each. They are more stylish and easier put on and taken off than sweaters, and promise to become quite popular with those

who wish a special garment for out-of-doors sport.

HOSIERY.

The hosiery market is so well sold up that notwithstanding the drop in the price of cotton the manufacturers who are at all open for business are advancing prices on their lines.

The yarn quotations show no weakness as yet, and probably will not for some time in view of the fact that spinners are so far behind on their contracts.

The demand for nearly all lines of hosiery continues good, and it is a difficult matter to point to any one line of ladies' goods as being slow.

Reports are somewhat conflicting as regards the most popular colors for spring, 1907, but judging from the orders so far placed, white will again be the most popular, although there is a tendency toward light colors. The new fall shades in demand are wine, olive, wood and tobacco brown, to match the new shades of dress goods and silks. Greys and light tans are being called for to quite an extent, but it is believed by many that the greys will not be good for but a very short time. Tans are increasing in popularity right along, and indications are that they will be in greater demand for 1907 than for the last two years.

Fine gauge domestic seamless goods are practically sold up for the season as far as manufacturers are concerned, the output having all been taken by the jobbers.

Mercerized goods are taking well, and quite a few more manufacturers are making them this season than heretofore.

Split-foot goods are scarce, and anyone that has them to sell can get good prices for them. Customers are beginning to call for tans and other colored hosiery made with split feet, and are apparently learning that a stocking made with maco sole is more sanitary and comfortable than with a dyed foot.

Laces are getting smaller gradually while gauzes are increasing in popularity.

Lisles in anything lower than 50 cent qualities are hard to get.

Embroidered goods are active, and indications are that they will be just as good for 1907 as they are in 1906.

CHEMNITZ REPORT.

During the past month the market has undergone a radical change. Prices have advanced considerably, and makers are not in a position to accept orders at prices quoted a month ago.

Maco yarns are higher than they have ever been, and in addition to the high priced materials a considerable advance in wages has taken place. Laboring people have demanded higher wages, and manufacturers have been obliged to grant the same in order to get the goods made. Staples are now higher, as are also all lines of embroidered goods.

Most of the makers are now showing small lines of samples, having been obliged to withdraw a great many numbers from their line, and buyers going into the market must expect deliveries as late as April and May.

The demand has been particularly large on all fine gauge goods. This product is about sold up, and those buyers who wished to place orders for one thousand dozen lots are only securing one hundred and two hundred dozens as an accommodation, and in some instances are paying from 10 to 15 per cent. more than the prices quoted a short time ago.

Embroidered goods are in very good demand in the East, taking the small, neat effects in hand embroidery, and only a very few small flower designs, while the Western trade takes more of the flowers and buds and the rather large effects and loud colors.

Manufacturers of lace goods are also showing rather limited lines now in spite of the fact that American orders have not been nearly as heavy as last year, but the other markets of the world have taken such large quantities that the goods are scarce and prices are high. Goods to retail at 35 cents are out of the market, and even at the second limit price very few are to be had.

The production of misses' ribbed hose and infants' lace socks is well sold up, and it is a difficult matter to get help to work on infants' goods as they all want to work on the large cotton machines where they can make better pay.

Men's lace half hose are very scarce, while

in plain cotton the demand is not so large.

The scarcest article in the market is split-sole goods, and there is scarcely any of these to be had at all. These will be scarce all the season as the production is not as large as in former years.

Glove manufacturers are not open to take any more orders except for very late delivery. The demand for long silk gloves continues and almost any price can be had for goods that can be had for early shipment. Lace top long gloves are being shown in a variety of pretty designs to retail at from $2.00 a pair up, and some fairly good orders are being placed on these as well as long silk gloves with embroidery.

WARP KNITTING.

BY FRANZ REH,
(Professor at the Vienna Textile School.)

[The popularity of warp knitted fabrics for gloves at the present time makes the following description of warp knitting of especial interest. It is taken from La Fabrication de la Bonneterie, a work originally published in German, and which has been translated into French, from which the following extract is taken. Ed.]

Warp knitting differs from the ordinary knitting in that the fabric is made not by looping the single thread upon itself, but by the interlooping and interlacing of a number of parallel threads. These parallel threads are called the warp and the process of interlacing them is called warp knitting.

In order to understand the construction and to be able to distinguish warp knitted fabrics and the meaning of the technical terms the better way is to make a close examination of a sample of the goods and the method of forming the loops of which it is composed.

FORMING THE LOOPS.

Considered as an abstract proposition the formation of the loops is the same in warp as in ordinary knitting. In warp knitting a horizontal row of loops is produced simultaneously, the new loops resulting from carrying the lower or old loops below those newly formed on the needles. This at least is what takes place with spring needles, while with latch needles the new stitches are formed by drawing the new loops over the old ones. The difference between warp and ordinary knitting consists in the manner in which the new stitches are formed. A row of loops on warp knitting does not result from running one thread on the needles and then lowering the sinkers, but results from the distribution in a predetermined order of each of the numerous warp threads under and over one or more needles of the machines. In place of the looping we have this distribution in warp knitting.

PART OF THE MACHINE.

The elementary and indispensable parts for forming the stitches in warp knitting are: the needles, sinkers, pressers and a device for carrying the warp threads called the warp mechanism. The needles are similar to those used for ordinary knitting. They include the spring needles with the points bent back and moved in a groove by the presser, and the latch needle, hinged and with a short hook at the end. The sinkers used with the two kinds of needles are similar to those used in ordinary knitting except that the nose is dispensed with. The sinkers are fixed, that is to say, they are not moved individually; they are displaced simultaneously in order to slip the loops on the needles. The presser consists of a plate that carries the points of the needles into the grooves. The warp mechanism has no counterpart in ordinary knitting.

In order to distribute the threads over and under certain needles it is necessary to carry them backward and forward; for this purpose they are passed through the eyes of special guide needles. These guide needles, fixed in leads on the carrier bars, face the regular knitting needles in such a way that the guide needle comes at intervals of two knitting needles. The bar serves to carry the guide needles first below and then above the row of knitting needles, and in each of these positions it can be moved sideways so as to distribute the threads as has been explained.

OPERATIONS IN WARP KNITTING.

The formation of the stitches in the simplest form of chain knitting is shown in Figs. 24 to 29. In order to start the fabric it is necessary at first to form a row of loops which take the place of the old loops and

which after being interlaced with the new loops are formed into stitches. The new row of loops is formed by raising the bar so that the guide eyes, 1, carry the threads of the needles, n; then by moving the bar sideways the distance of one needle and lowering

Figure 24.

Figure 26.

it the threads thus form loops around the needles, n, as shown at Fig. 24. This first row are considered the old loops and are held by the throats of the sinkers, that is to say, pushed back on the needles as in ordinary knitting and thus isolated from the front part of the needles. Then the new loops are

Figure 25.

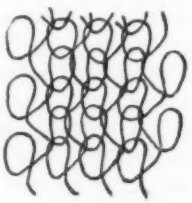


Figure 27

Figure 28.

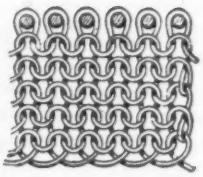


Figure 28a.

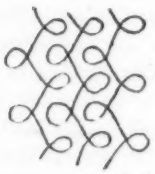


Figure 29.

formed and the bar carrying the guides is moved sideways a distance of one or more needles, Fig. 25. As long as the guide eyes remain below the row of knitting needles the threads are distributed under the needles. When, however, the guide bar is raised so that the eye of each guide needle comes above the knitting needle, then moved sideways for one needle and lowered again, the distribution on the needles, Fig. 26, is accomplished. The loops thus formed are separated from the old stitches by the nose of the sinkers. These sinkers push the loops backward under the point of the needle and hold the old loops back. The presser then is brought into action and isolates completely the second row of loops by bringing the points of the needles in the grooves. At this moment the old loops are carried around the ends and lowered after being separated by the presser. The new loops hang at the point of the needle to be in turn converted into stitches. Figs. 28 and 29 show the warp knitting resulting from this process. This shows how each thread passes under one needle, then over the next needle. In the succeeding row the movement is reversed, the distribution being as follows: under 1, over 1, to the right and return.

Fig. 29 is a sketch such as is used to indicate the structure of warp knitted fabrics and shows the distribution of the threads. Each new row of stitches is produced in the same manner as the preceding row, the row previously made being considered the old loops. The use of latch needles involves modifications similar to those found necessary in ordinary knitting. If these self-acting needles are moved independently the sinkers are unnecessary and are replaced to a certain extent by the knock-off motion. The presser disappears and the guide is first carried forward and then backward forming the loops in a manner as simple as it is exact.

DIFFERENCE BETWEEN ORDINARY AND WARP KNITTING.

Figs. 28 and 28a illustrate the difference between warp and ordinary knitting. In the latter, Fig. 28a, the thread runs horizontally while in the former, Fig. 28, it runs vertically. Two adjoining loops in ordinary knitting are interlaced at the lower part by the horizontal loop. The interlacing of warp knitting is made obliquely upwards, first from left to right and then from right to left. This distinctive characteristic of the two kinds of knitting is disclosed clearly by the back of the fabric.

WARP KNITTING MACHINE.

Warp knitting is a much more recent invention than ordinary knitting. It was in 1775 that Crane invented the hand machine for warp knitting.

NEW MACHINES FOR WARP KNITTING.

There is a great similarity between these machines and the ordinary hand knitting machines. The frame carrying all the parts necessary for the formation of the fabric is equipped with treadles at the bottom. The warp is then wound around a wooden drum and held under tension in order to regulate automatically the delivery of the threads. From this beam the threads, passing over a carrier roll, is run through the guide eyes in the carrier bar. This carrier bar placed, as has been explained, opposite the row of knitting needles, can be moved in three ways: 1. A horizontal vibration to bring the ends of the guide eyes under the knitting needles either backward or forward. 2. A vertical vibration to carry the guide eyes above or below the row of knitting needles. 3. Finally the movements to the right and left to accomplish the distribution of the threads.

The knitted cloth is wound automatically on a second beam. The carrier rolls and the accompanying parts constitute the warp mechanism. On the hand machine these displacements of the guide bar are made very easily. To this bar is fastened a gear rack connected with a pinion gear which is turned by hand by means of a button or crank, thus moving the gear rack and displacing bar. On the axis of the crank is mounted a notched disk; each notch corresponds with the space between the two adjoining needles. At each notch a hook connecting with the ratchet holds the rack in place and it is thus easy to see how far the guide needles have been moved. As the different displacements are corelated with the other movements of the machine, such as the rise and fall of the guide needles and the movement of the sinkers for forming the loops, the automatic operation of the different parts of the machine is very simple. Each carrier bar is pressed by a spring against a plate, which is not circular, but presents raised and lowered places. At each turn of the plate the guide bar is moved backward and forward to distribute the threads. This movement of the plates is effected by the aid of a ratchet wheel and catches, one being used for lowering the bar, another for gauging the loops and the third for raising the mechanism. As in the two former cases the guide eyes remain below the row of knitting needles; the distribution of the threads takes place under the needles. The last displacement, that is, the rise of the bar, takes place when the guide eyes are above the row of knitting needles and the distribution is made over the needles.

POWER MACHINES FOR WARP KNITTING.

Since the beginning of the nineteenth century efforts have been made to operate warp knitting machines by power and thus as far as possible make it unnecessary to depend upon the intelligence of the operator. The first power machines for warp knitting were identical with the treadle machines, the movement being the same except that they were automatic. The displacement of the guide bars was first effected by means of plates, which were necessarily of very irregular design with the pattern covering several rows of stitches. In order to avoid the use of these eccentrics of large diameter a jacquard mechanism was adopted, being placed at the side of the machine. Machines of this type were called lateral operated machines for warp knitting.

MACHINES FOR WARP KNITTING.

On the other hand the tatting looms for weaving lace curtains were called central jacquard machines because the jacquard mechanism was placed in the middle. In the tatting machines the jacquard motion does not operate the entire bars, but only the individual guides in order to increase, diminish or avoid the perforations in the cloth.

The guipure machines belong to this class and are used in the production of similar goods. There are a number of other power warp knitting machines which differ materially in construction. In place of forming the loops by spring needles with sinkers and pressers the Raschel machine operates with two rows of latch needles. These needles are nearly vertical and rise and fall on fixed

knock-off bars. The fabric is drawn between the two and may have a double face with loops knocked off on both sides. Above the needles the guide bars, to the number of four or more, vibrate backward and forward, and consequently present the guide eyes of the needles sometimes inside and sometimes outside the latch needles. The vibration of the

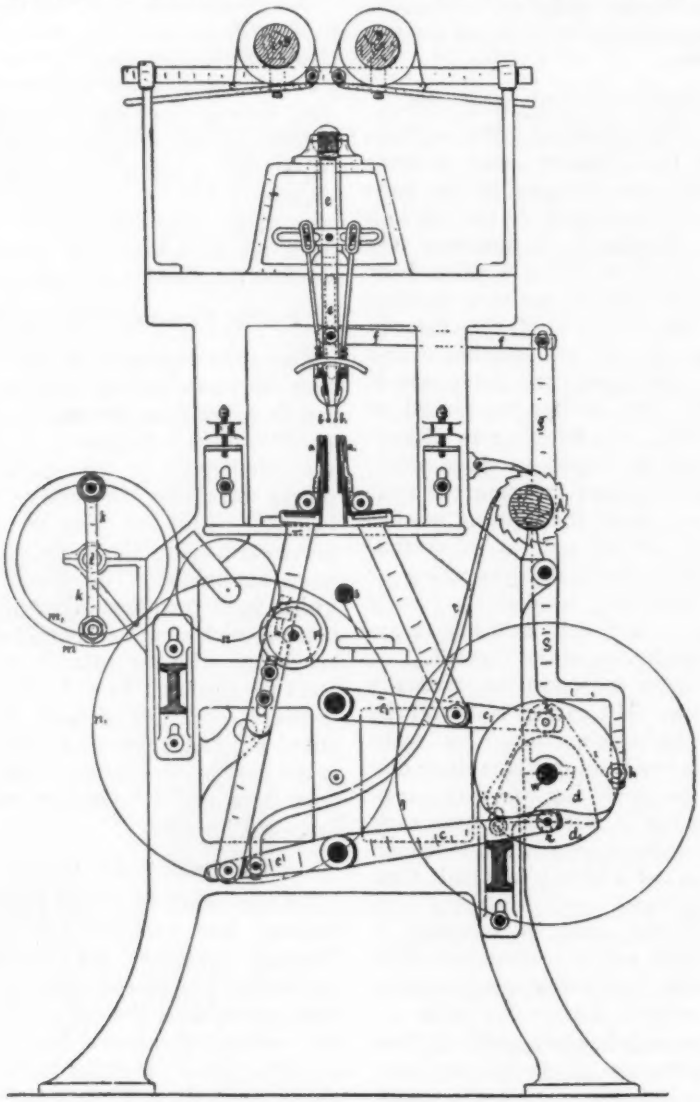


Figure 30.

THE RASCHEL WARP KNITTING MACHINE.

aa. Rows of latch needles.
bb. Carrier bars for the guide needles.
cc. Levers.
dd. Eccentrics for working the levers.
e. Levers for carrier bars.
f. Driving bars for levers.
g. Driving lever.
h. Stud for lever g.
i. Eccentric driving the carrier bars.
k. machine crank.
l. driving shaft.
mm. nn, pq. Gears.
w. Shaft of eccentric.
rr. Studs.
s. Guide roll.
A. Cloth Beam.
B. Warp Beams.

bars and the ascent and descent of the latch needles result from the action of the eccentric plates mounted on the driving shaft, the latter being driven by a chain of gears and a crank shaft. The lateral displacement of the guide bars of the Raschel machine is effected not by eccentrics, but by chain blocks of different heights mounted on a cast iron drum. The order of displacement of the bars is determined by the speed of the drum. These chain blocks are assembled in the order of the threads to be distributed. Each block bears a number based on its height so that the blocks of equal height have the same number. The lowest block is numbered O. The block above corresponding to the division of one needle is numbered 2; for two divisions the number 4 is used, etc. Any desired pattern is drafted by arranging the block numbers to correspond with the design.

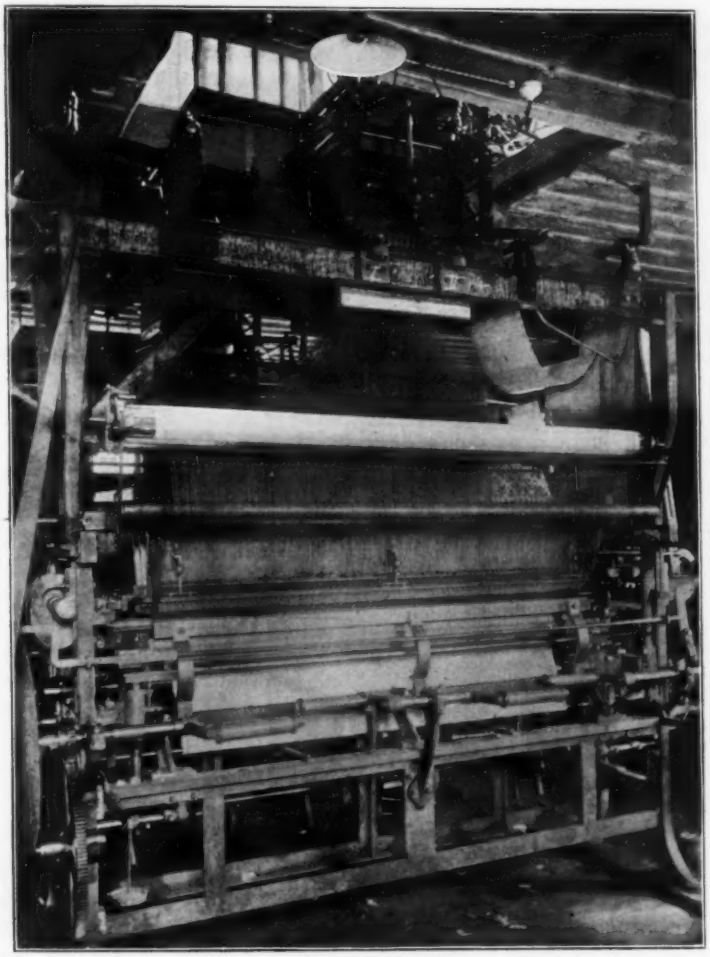


FIG. 30A. A RASCHEL WARP KNITTING MACHINE.

For a long time the knock-off laps on the Raschel machine involved considerable difficulty; these threads were the loops pressed against the old stitches without being interlaced, and held in place merely by the surface of the knitted fabric. Now, however, the extra threads which are not to be formed

into the new loops are quickly united with the row of old loops by the presser wheel. The Raschel machine is also provided with a fringing apparatus which extends the scope of the machine and justifies the preference given it.

[An illustration of the latest type of the Raschel machine is shown at Fig. 30a. This machine, for which The Grosser Knitting Machine Co., 260 West Broadway, New York, are the American agents, embodies many improvements in design and construction.]

(To be continued.)

A LATCH CLOSER FOR KNITTING MACHINES.

Figs. 1 to 4 illustrate a needle cylinder and latch closer, recently patented, and described by the inventor as follows:

In machines for knitting hosiery, underwear, or any fabric having a loose course, es

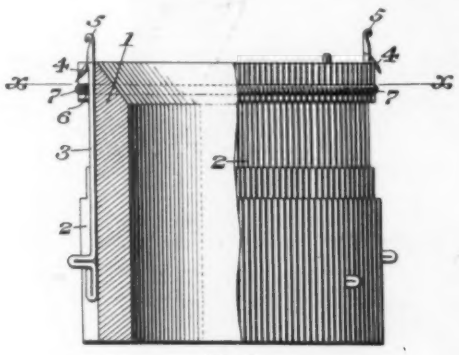


FIG. 1.

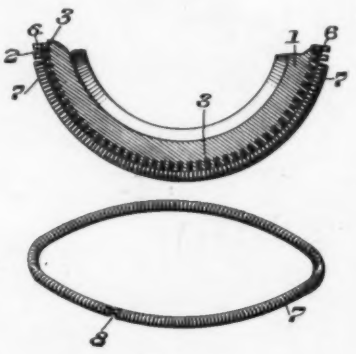


FIG. 3.

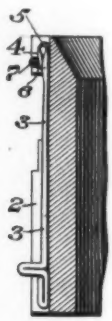


FIG 4.

pecially when working with lisle, worsted, or cotton thread, the large loops formed when the cam draws the needles down to make the loose course or slack fabric have a tendency to fall from the needles as the latter are raised by the cam, thus causing drop-stitches. This invention presents means for preventing this stitch-dropping. It consists of a novel construction of a needle-cylinder having an external guard-band for engagement with the latches to close and keep them closed. This band is held upon the cylinder by any suitable means, as by a groove or projection.

Fig. 1 is a side elevation, partly in section, of a device embodying my invention. Fig. 2 is a sectional view on line x x, Fig. 1. Fig. 3 is a longitudinal section of a portion of the needle-cylinder. Fig. 4 is a perspective view of the spring in detached position.

As the needle is lowered the latch engages the band, 7, and is closed. The latch is maintained in closed position as the needle is moved upwardly by the cam mechanism until the needle has been raised a sufficient height above the band for the latch to open. This prevents the large loop which is formed by the hook from slipping off the hook during the operation. The loop slipping from the hook as the needle is being raised is the cause of drop-stitches and hence imperfect work. There is a great advantage in preventing the stitches dropping from the hook and also in the making of a loose course, as the operator can work with much greater rapidity in knitting the tops and also in knitting the feet of hosiery.

FIG. 2.

This device when a slack fabric is being made would be in constant use, but in tight webbing it is used only when the loose course is being made, and the device does not interfere in any way with the making of the tight webbing.

Machines now in use may be readily equipped with the device, since it is only necessary to attach a band in any of the ways described, as by milling an annular groove at a suitable point near the upper end of the needle-cylinder and placing therein a spiral spring-band or a non-resilient band with which the latches of the needles come in contact and by means of which the latches are kept closed after the loop is formed and the needles are being raised by the cams.

AN IMPROVED UNDERGARMENT.

The construction of the undergarment shown in the accompanying illustration has recently been patented in this country. Fig. 1 is a plan view of the garment; Fig. 2, a sectional view of a piece folded for several garments to be cut; Fig. 3, the form of the blank when cut; Fig. 4, a front view of the garment.

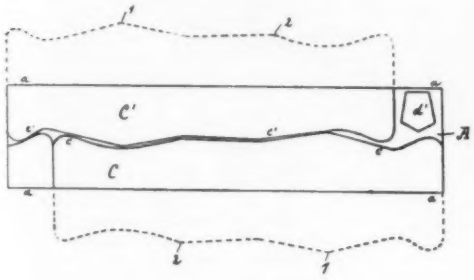


FIG. 1.

B shows a flat or single-ply piece folded preparatory to being cut according to the pattern in the same way in which the tubular piece is to be cut, the piece being folded to present the lines, b b, equally distant as the lines, a a, in the tubular piece. The cutting is done in the same way in either case. In the first case the line, a a, is the medial vertical line of the garment, and in the latter the line, b b, is such.

eration cuts out the blank for a single garment from a tubular piece or a number of blanks when cut from a folded piece, according to the number of folds. The pattern is then laid in reverse position, as at C', Fig. 1, and the cloth is cut on the line, c' c'. This operation of cutting blanks from the tubular piece or from the folded piece leaves but small portions of the cloth between c c and c' c', the next cutting operation utilizing the small corner-pieces which remain after the first cut, and the small pieces, d', may be used for gussets or pockets.

The dotted lines in Fig. 1 show the complete outline of the blanks after being cut and unfolded. The blank, it will be seen, is widest at point, 1, that half being wider than the other, so that when the blank is folded one end on the other, as in Fig. 3, the front of the garment is materially wider than the back at about 2 2.

The edges are stitched in side seams, the sleeves being inserted on the seam-line, and all the necessary fullness is thrown into the front of the garment and at such other parts as required, as shown in Fig. 4.

It is claimed that the result is a garment cut with the greatest possible economy of material and time, as a number can be cut at a single operation; at the same time, without any additional labor or cost over the ordinary garment, it is given the required fullness in the front.

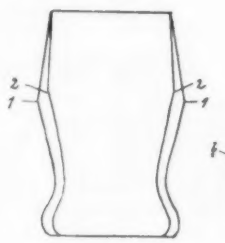


FIG. 3.

FIG. 2.

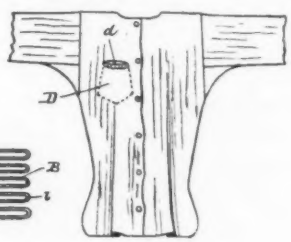


FIG. 4.

C represents the pattern, which is to be laid on the material with its straight edge coincident with line, a a, or line, b b, in case the garment is cut out of cloth folded as shown in Fig. 2. The cloth is cut out on the line, c c. The pattern (and the piece cut out) show on one face one-half of the front part of the garment and the corresponding or connected half of the rear part. This op-

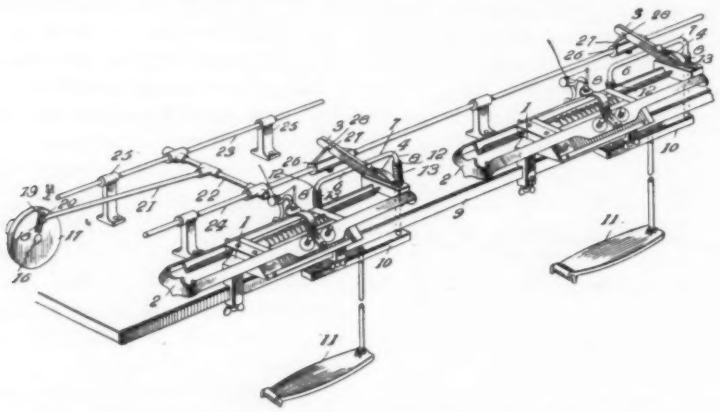
A pocket, D, is placed in the front by cutting an opening, d, and fastening the blank, d', on the inside of the front in the lines of stitching shown.

Canada comprises one-third of the area of the British Empire, or 3,745,574 square miles. The area of the United States is 3,567,563 square miles.

Recent Textile Patents.

KNITTING MACHINES. Power Mechanism for. 824,565. Thomas F. Morris, Waterford, N. Y.

In the manufacture of gloves it is customary to knit the fingers and thumbs separately after the body of the glove is made. To accomplish this operation, it is essential that the machine be under



perfect control to stop and start it to knit a predetermined number of stitches; otherwise the finger or thumb formed would be either too short or too long.

With the machines generally in use the carriage is reciprocated by hand, which is slow and laborious, so much so that skilled operators soon tire. With the present invention a knitting machine of well-known type is used and mounted adjacent thereto is a reciprocating shaft provided with a latch-holder engaged by a spring-actuated latch controlled by the operator to reciprocate the carriage and yet permit the latter being thrown out of the field of the latch-holder to start the stitches between the body and finger, which is essential to accomplish high-grade work.

Merino Hosiery.

Editor Textile World Record:

We find it easy to full woolen hosiery and get the goods lofty, but have been unable to obtain a lofty feeling on merino goods. Can you offer any suggestions? Cork (735).

The difference in the feel of woolen and merino hosiery arises from the difference in the raw material. Wool is naturally lofty, whereas the mixture of cotton and wool called merino necessarily partakes of the dead, lifeless feel of cotton. In the absence of samples of the goods to which Cork refers, it is impossible for me to offer any definite suggestions as to how the handle of the merino goods may be improved. Baumwolle.

Bundle Straps for Hosiery.

Editor Textile World Record:

We are in need of bundle straps to tie up the work from the knitting machines every night. What is best for this purpose and can you give me the names of some makers of such things?

Crawford (713).

All the knitting mills with which I am acquainted make their own tie straps by cutting strings from the waste pieces of knit cloth. After these strings are used they are thrown back into the waste to be cut up into shoddy and used again with the raw stock. These strings do not cost the manufacturer anything and they serve the purpose for which they were intended. I think very few manufacturers would go to the expense of buying tie straps even if they are made, and I never have heard that there is such a thing on the market.

Esek Easton.

Knitting Dry Woolen Yarn.

Editor Textile World Record:

We find frequently that woolen yarn will not knit well because it is dry, and that the difficulty is remedied by running it through a woolen cloth in winding. Can you explain why this is the case?

Donegal (727).

I think the reason for the dry woolen yarn knitting better after running it through a woolen cloth in winding, is that the cloth causes a tension on the yarn, that all the fine or twitty places in the yarn break out during the process of winding. Without the cloth these would go through until they came to the knitting machine, where they would break and cause holes. I should like to have some of your readers give their reasons for this. Esek Easton.

I have found that by running dry woolen yarns over a woolen cloth well saturated with oil or with a preparation of "oil, soap and water" will always give good results, as it will make the fuzzy ends lay down and liven up the yarn so it will not kink; it also removes the wiry effect. In my opinion the same results cannot be obtained by running over a dry woolen cloth. Dan Bucklin.

Reddish Shades on Oxidized Black Hosiery.

Editor Textile World Record:

Can you give us any reason why the enclosed sample of black hosiery should be of a reddish cast, rather than a blue, as we have been in the habit of getting? Lately our aniline oxidized black has been turning out rather more on the red than we would like and so far we have been unable to check it. Our formula is as follows:

First barrel: 32 lbs. chlorate of potash, 25 lbs. bluestone, 5 lbs. acetate of lead, to one barrel of water.

Second barrel: 120 lbs. aniline salt, equal parts of each of the above.

The contents of both barrels are put in the tomtom and the goods worked for forty minutes. They are then whizzed fairly dry and are left on the truck over night. At seven o'clock in the morning they are entered in the oxidizer and the temperature raised gradually to 110 degrees F. The goods are usually thoroughly oxidized about twelve o'clock after which the fumes are cleared out and the oxidizer run at 90 degrees F. until the goods are thoroughly lisled, which usually takes about five hours. They are then spread out and left till morning when they are washed in a solution of 3 1/2 per cent. bichromate, 3/4 per cent. bluestone, and 14 ounces sulphuric acid to the 100 pounds. They are run in this solution for about twenty minutes, after which they are rinsed and softened with a solution made of 1 pound olive oil soap, 1 pint olive oil, and 3 pounds glycerine.

Rosedale (718).

The reason for the goods turning red is that they are over oxidized. To heat to 110 degrees F. brings the goods to the danger point of tendering. This high heat, together with the additional oxidizing given the fabric during the lisling process, is the chief cause of the red tint. Rosedale says that formerly he has obtained a blue shade by the same formula. If he has there has been some change in the method of working, or the dyestuffs used now are inferior to those used before. While formulas for dyeing any shade do and will vary at times, there is no formula that, carefully worked, will give one shade at one time and then without any reason give an entirely different shade at another time. I think there must have been some change in either the formula or the ingredients, and these changes, however slight, have changed the tint.

The formula given is a good easy working one, but I think 5 pounds more of bluestone could be added to advantage. It would be even better to try the formula given below, which appeared in the February issue of the Textile World Record:

40 lbs. Bluestone,
30 lbs. Chlorate of Potash,
12 lbs. Sal Ammoniac,
6 lbs. Verdegris,
130 lbs. Aniline Salt,
Water to make the solution 14 degrees Tw.

The goods appear to be rather thin in color; possibly pounding them forty minutes is not enough. Again the stock liquor may not be strong enough. Many dyers run their stock liquor at 14 degrees on single run blacks. The amount of moisture left in the fabric varies with different dyers, but a very good rule is to leave an amount of liquor equal to the weight of the goods dyed.

For oxidizing I would recommend a temperature of 100 degrees instead of 110 degrees, as the latter is too near the danger point, besides producing the objectionable violet shade. Hummel, the technical writer on dyeing, said in regard to this subject, that "the less oxidized product is a blue black," which is somewhat sensitive to acids. He also says that "the more highly oxidized product is a violet toned black that is not turned green by acids. This is produced by submitting the former to a supplementary oxidation."

While it is difficult to color aniline black, and all dyers have more or less trouble with it, there is no reason why a formula once worked out correctly should not be adhered to and satisfactory results be obtained if care is used. I would suggest that the stockings be pounded for ten minutes longer with the stock liquor 14 degrees Tw. Do not extract too dry or oxidize too warm or too long. Chrome with 5 per cent. bichromate of soda for twenty minutes and watch carefully the changes that take place. These changes should help solve the trouble, and last but not least make the changes slowly, observing the effect of every change. Time every operation to the minute. Have each ingredient carefully weighed and properly mixed. Work every lot as near the same time as possible; see that the stock liquor is kept cool. Some dyers use ice for this purpose so that premature oxidation does not take place. Finally keep at it, and with care and observation and some slight modifications of the formulas and methods the desired shade will be obtained.

Baumwolle.

The sample submitted is decidedly too red and heavy. I would suggest that all the ingredients be cut down but aniline salt, and the process be carried out as usual. When chroming three per cent. is enough. If this is not satisfactory on the next batch add to the dye bath 12 pounds of sal am-

moniac and 40 pounds of nitrate iron, and when chroming use no acid or blue stone. This will make it bluer. If the rest of the process is satisfactory there is no use in changing it.

Morrison.

Yellow Knit Goods.

Editor Textile World Record:

The suggestions we have received from you on the discoloration of knit goods have been very helpful to us. Wolcott (706).

Bleeding Scarlet in Hosiery.

Editor Textile World Record:

In scouring our woolen hosiery knit of white yarn with scarlet or blue cloud, the scarlet dye bleeds into white. Omitting soda and using only fulling soap will not remedy it. Is there a chemical which will set the dye? We have been advised to use potash soap for this purpose, but have not experimented with it yet. Dundee (734).

There is no chemical which will set the dye in this case. Dundee is at the wrong end. The place where the color should be set is in the dyeing, and not in the fulling. The dyer should use a red and blue dye which will be fast to milling. There are colors which will stand any milling that hosiery should get. Evidently Dundee's dyer is not using colors that seem to meet this requirement.

Goods can be milled so hard that no color will stand the test. There should be no trouble with ordinary work if the soap is not too hot or too strong. The writer has fulled merino stockings for one hour in the hammer mill and given them one warm and one cold water, without any trouble from bleeding. Some of the stockings were stored in a sulphur house twelve hours besides. This cannot be done with red or blue; the color will have to be used which will stand milling. A good woolen or worsted will not need a hard milling, as excessive milling is apt to make the hosiery boardy. Baumwolle.

KNITTING MILL NEWS.

New Mills.

*California, Berkeley. The J. J. Pfister Knitting Co., whose plant was destroyed by the earthquake and fire in San Francisco, will rebuild in this city at the corner of Parker and Eighth streets. Contract for a two-story building, 70 by 150, has been let. Most of the machinery has been ordered.

*Illinois, Chicago. Arrangements are being made by Robert King, 82 Walnut St., to purchase two power toque and two hand power hosiery machines for the new plant he is to start. Will make toques, hosiery, men's gloves, baseball and football stockings and knit mufflers.

*Illinois, Freeport. The branch mill of the Rockford Mitten & Hosiery Co., of Rockford, Ill., will be equipped with 100 knitting machines for the manufacture of wool hosiery. Expect to start early in August. Buying is done at Rockford.

*Indiana, Logansport. The Logansport Underwear Company has been incorporated with capital stock of $15,000 and started operations in their new mill, making men's union underwear. Dennis Uhl is president of the company, Wm. F. Schnelle, treasurer and H. B. Lyons, superintendent. The plant is equipped with 6 knitting and 18 sewing machines and operated by water power. Product will be sold direct.

*Michigan, Middleville. The Thornapple Knitting Company, capitalized at $125,000, expects to start operations about Oct. 1st, with 30 knitting and 50 sewing machines, making men's ribbed underwear. E. A. Clements is president of the company and H. M. Liesveld, treasurer. Goods will be sold direct and through Robischon & Peckham, New York. The Warren Featherbone Company's property has been purchased and is being remodeled.

*New York, Amsterdam. The new mill being built for the Blood Knitting Co., to employ about 300 people, will make men's ribbed underwear; 80 knitting machines, 275 sewing machines; sell direct. Jno. R. Blood and Jno. Barnes are the buyers.

*New York, Brooklyn. Max Strauss, formerly with the American Knit Goods Manufacturing Company, is interested in the Long Island Knitting Company, which has been organized for purpose of manufacturing cardigan jackets, sweaters, bathing suits, etc., at Wythe Avenue and Penn Street.

*New York, Cohoes. There is an unverified report that Fuld & Hatch may build or lease another mill to provide for their increase in business. It is said that they have plans for a building of concrete construction, which will be located south of Oneida St.

New York, Stittville. W. T. Atwood, who sold his interest in the knitting mill to his partner, Mr. Hackett, has purchased the old cheese factory and is converting it into a knitting mill. He will employ 35 hands and expects to begin operation in November.

New York, North Tonawanda. The Gloversville Textile Co. will build another large factory to provide for their increasing business. Only last year a new branch plant was established at this point to make silk gloves, and the demand for these goods calls for additional facilities.

*North Carolina, Hickory. The Hickory Hosiery Mills have been put in operation with 27 knitting machines, one sewing machine and 6 loopers. C. C. Bost is president of the company, W. V. Clive, treasurer; E. B. Crane, agent and J. A. Clive, superintendent. A dye house is also attached to the mill. Goods are sold through E. B. Crane.

North Carolina, High Point. A new company has been formed with same officers as the Durham Hosiery Mills, to operate the plant recently purchased from the High Point Electric Power Co.

and used by the Centaur Knitting Mills. It is proposed to install from 100 to 150 knitting machines.

*Pennsylvania, Manheim. The project in which Chas. S. Witmyer is interested has taken shape and is to be known as the Manheim Knitting Co., located at the corner of South Charlotte and Railroad Avenue. A. K. Kauffman, president; Chas. S. Witmyer, secretary; will make men's and women's cotton Swiss underwear, finish and bleach. Eight latch needle machines; six sewing machines; steam power; buy 10s to 22s yarn. Expect to start up Oct. 1st.

*Pennsylvania, Philadelphia. The Defiance Knitting Mills, recently incorporated, are operating 28 knitting machines and 22 sewing machines for ladies' and misses' ribbed underwear. Jacob Rositzsey is president, Caleb Jofpe treasurer, P. Boardman superintendent. The goods are sold by Jas. Risk, 43 Leonard St., New York.

*Pennsylvania, York. Contracts have been let for erection of new mill for Jos. Black Sons' Co. and the machinery equipment. It is expected to have the new plant in operation by next spring. The main building will be 488 feet front, with three wings, one story. A separate building will be erected for dyeing purposes.

Facts and Gossip.

*Delaware, Wilmington. The Delaware Hosiery Manufacturing Co. will build a new dye house and power house, 100 by 60 feet, one story, in addition to the new mill, 114 by 60 feet, four stories. It has not yet been decided whether plant will be operated by steam or electricity.

*North Carolina, Goldsboro. The Goldsboro Knitting Mills, recently incorporated, expect to begin production about Oct. 15th, making half hose and ladies' hose; capital stock $30,000; Geo. C. Royall, president, A. N. Kornegay secretary and treasurer, A. L. Bassett superintendent. There will be 50 knitting machines; dye house; steam power. We understand the selling arrangements have not yet been perfected.

New Jersey, Camden. The knitting mill of James R. Smyth at 661 Van Hook St., has been shut down and will not be started up again. The equipment consisting of 20 knitters, 4 ribbers and 1 looper, will be sold. The plant was run on ladies' and children's hose and men's half hose and was the only knitting mill in Camden.

New York, Brooklyn. It is reported that W. A. Ingalls, manufacturer of knit goods, has consolidated with the Hewson Woolen Mills Company at Amherst, N. S. The latter company has been reported to start a large knitting department in addition to their woolen mill.

New York, Phoenix Mills. The branch mill of the Fenimore Knitting Mills, which they have been operating at Index, is to be closed and the machinery consolidated with the main plant at this place.

*North Carolina, Winston-Salem. P. K. Green of the Carolina Mills Co. is now moving the plant of the Centaur Knitting Co. of High Point to Winston-Salem, and the consolidated plant will be established in larger quarters, which he expects to have in operation about Sept. 1st.

Pennsylvania, Bridgeport. The Kaufman Manufacturing Co., manufacturers of boys' and girls' seamless ribbed hosiery and men's half hose on 285 knitters, in order that they might increase their plant have fitted up an adjoining building for office purposes, the main building being used for manufacturing only. They also dye, bleach and finish the product of the plant.

Pennsylvania, Philadelphia. The J. H. Sprowles Company, Wayne Junction, manufacturers of cotton and woolen hosiery, which they sell direct, report that they have recently added a considerable number of new knitters, auxiliary machinery for making lace work and also machinery for their finishing plant. They claim to have orders enough booked to date to keep them running full time for many days to come.

Pennsylvania, Philadelphia. Harry Wolstencroft, manufacturer of 176 needle half hose on 30 knitters at 2731 North 6th Street, has recently put in machinery for the purpose of embroidering his own goods, for which he has many orders on hand. He sells through Richard C. Maddock, Bourse Building, Philadelphia.

Pennsylvania, Philadelphia. The Adams Hosiery Co., 2420 Waterloo St., manufacturers of misses' and ladies' seamless lace lisle thread hosiery, state that they are now running off of lace goods for immediately delivery with plenty of orders on hand for future delivery. It is the intention of the company, within a short time, to put in machinery for the manufacture of children's ribbed hose.

*Tennessee, Knoxville. The Knoxville Knitting Mills have purchased the property of the Southern Trunk Co. and propose erecting on the site a large concrete building to double size of floor space. In the new building they propose installing modern dyeing machinery.

Personals.

Frank D. Davis, for a number of years bookkeeper at the Anchor Knitting Mills, of Rome, N. Y., has resigned and taken a position as traveling salesman for Rausch & Co., commission merchants, of New York City.

William A. Herington has accepted the position with the Columbia Hosiery Co. of New York City.

George Davidson of Depew, N. Y., has accepted a position as overseer of knitting, looping and seaming for the Middlesex Knitting Mills, Camillus, N. Y.

H. C. Lindloff of Bennington, Vt., has accepted a position as superintendent of the knitting mill in Schenectady, succeeding Geo. H. Jepson.

T. W. Dowland has resigned his position with MacKinnon Knitting Mills, Little Falls, N. Y., and has accepted one with the Utica Knitting Company.

New Machinery and Processes.

This department is designed to present from month to month a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to textile manufacturers. It is not a list of patents, but of improvements coming on the market. The idea being to present to our readers a systematic monthly record of new machinery etc., of interest to textile mill men.
We invite machine builders and others to send us such information for this department.

Excelsior Cotton Softener. The Excelsior Wool Oil Compound Company, Cincinnati, O., have introduced with much success the Excelsior cotton softener, which prevents sticking or gumming while the yarn is passing over the cylinders, and dropping of starch during the process of manufacture. It is used with starch batches. It keeps the goods clean and sweet smelling, and is highly spoken of by mills that are using it.

Oil Drip Can. James Muir, North Adams, Mass. An improved drip can. The oil does not accumulate in the can, is filtered and may be used several times. The claims are economy in the use of oil and prevention of dripping, which is often a cause of serious damage to goods in process of manufacture in mills and print works.

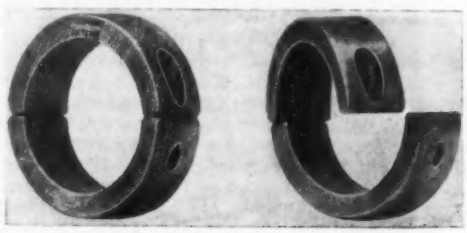
Hydraulic Presses. The Aiton Machine Co., 126 Liberty St., New York, has added to its product a full line of presses of all kinds; hydraulic, knuckle, hand and belt driven presses.

Stop Motion for Knitting Machines. D. H. Hill, 2163 North Ninth St., Philadelphia. Pa., is bringing out a new stop motion for spring beard needles on round heads for making less work on hosiery, stockinet, etc. Breakage of thread stops the machine at once.

Pin Ticketing Machine. The Superior Pin Co. of Detroit, Mich., are bringing out an ingenious machine which in one operation prints on the ticket in two colors any data desired and attaches it to the fabric with a wire clincher, the points of which are turned over so that there is no danger of catching or injury to the fingers, and yet may be easily removed.

Card Feeder. The James Hogg Machine Co., Amsterdam, N. Y., are putting on the market the Hogg card feeder for woolen and worsted cards. This is the perfected invention of a practical manufacturer, who has aimed to combine simplicity, strength, durability and uniformity in quantity and quality. It is claimed that there is no rolling or sorting of the stock; that both long and short wool are handled so gently that the fibre is unbroken, giving strong yarn with very little noil.

Clearer Device for Spinning and Doubling Frames. Cook & Co., Manchester, Eng., recently brought out a simple clearer device consisting of rings placed at intervals on the lower roll. These rings, which are slightly larger than the drawing rolls, drive the clearer roll by friction at a higher surface speed than that of the drawing roll. This, it



is claimed, ensures perfect clearing. The waste is also more loosely wound on the clearers. The accompanying illustration shows the construction of the rings.

Stamping Textile Goods. E. Heyes & Co., 1 College Land, Deansgate, Manchester. A transfer process for marking hosiery and other textile goods, which is meeting with success in England. It is stated that goods can be stamped by this process at a cost of 30 cents to $1.00 a thousand.

SIMPSON'S CLOTH WINDING MACHINE.

The H. W. Butterworth & Sons Co., Philadelphia, are builders of the cloth winder shown in the accompanying illustrations. The machine operates as follows:

The cloth is started on the wood shell, A, Fig. 1, and is kept moving by coming in contact with the back drum, B. The centre-bar, C, which passes through the wood shell upon which the cloth is wound, is held by a pair of jaws at D.

As the roll of cloth increases in size, it rises and the pair of jaws rise with it. After a certain point, the bottom jaws stop rising, and the roll is held by the top jaws and the pressure on the drum.

After the jaws have separated two or three inches, the operator turns the hand-wheel, E, at the top, which raises the rack until the pawl catches in the notch-flange and the roll of cloth is in contact with both drums. Then a slight pressure with the hands will bring the roll of cloth forward into the hinged jaws, F, and it will keep on winding until it has reached the desired size.

Before this time comes, another wooden shell with a centre-bar is placed in the bot-

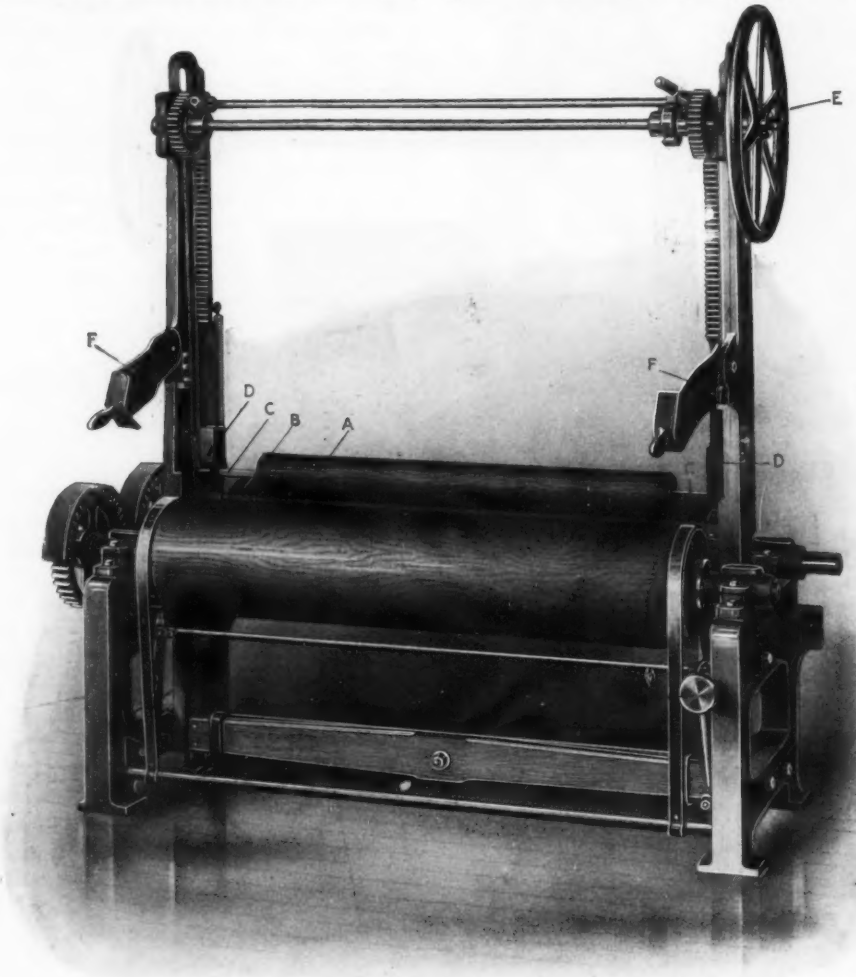


FIG. 1.

tom jaws, which were raised some distance above their original position. The hand-wheel is then released, and the empty shell will gradually drop to the position where the first shell started.

The operator then watches for a seam, and as soon as it approaches the empty shell, he quickly turns the knob, G, which instantly

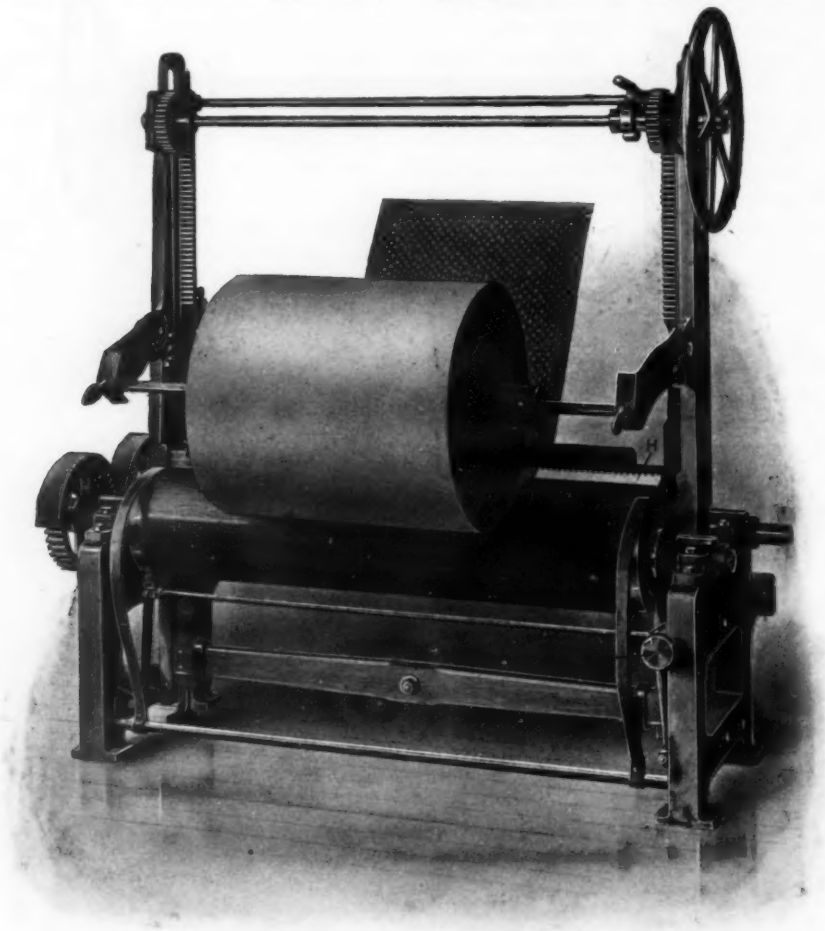


FIG. 2.

brings up the knife, H, Fig. 2, cuts the cloth, and the curved guides place the back end of the cloth around the new shell, and the cloth begins winding again. The operator can then remove the roll of cloth at his leisure. There is no lifting to do, for the roll is well up in the air.

The builders of the Simpson winding machine claim that it will pay for itself in about a year, the exact time depending on the size of the mill. They are confident that this machine leaves no reason for handling cloth in the finishing process except in rolls. Among the other claims are the following:

It saves the refinishing of forty or fifty yards soiled by other methods when finishing one roll and beginning another.

It keeps the cloth clean, smooth and at the full width from the beginning of the roll, preventing shrinkage and thus saving money.

It cuts the cloth at the same time, thus preventing waste.

It reduces the labor cost and prevents injury to the men.

Men are frequently ruptured by the im-

mense sudden strain put upon them. With the Simpson winder the men are not exposed to the danger of getting caught in the machinery, as they are with the usual method of rolling.

The builders state that the saving of time is not quite so clear a case; but it saves enough to take into consideration. Perhaps it adds twenty-five per cent. to the efficiency of the man who does the work. The men like it, and work is a great deal easier and better done when men enjoy their work.

The machine is very simple and does not require a skilled operator—not as much skill as is required by the usual winding method, which produces such clumsy and costly results. The machine does not wear out nearly so soon as most machines.

CORK INSERTS.

THE "COMPO" CLUTCH AND PULLEY, PATENTED.

The advantages of cork inserts in increasing the frictional power of clutches, pulleys and brakes has been thoroughly demonstrated, not only for automobile and for railway service, but also for looms and other textile machinery, under patents owned and licenses granted by the National Brake & Clutch Company, whose office is at 16 State St., Boston, Mass.

In the textile industry 600 loom friction clutches were used experimentally in a considerable number of well-known New England mills (including the mills of the American Woolen Company) prior to 1906, and the results obtained proved to be so satisfactory that the American Woolen Company has adopted this type of clutch. The 1,500 looms now being installed in the mill of the Wood Worsted Company at Lawrence, Mass., are equipped with this cork insert clutch, 200 looms so fitted already being in operation. Similar satisfactory results have been obtained by the Amoskeag Manufacturing Company of Manchester, N. H., which is equipping looms and Worrell clutches with the "Compo" attachment under license from the National Brake & Clutch Company. We are informed that the Crompton-Thayer Loom Company of Worcester, Mass., is now applying this clutch to its entire output, and that the Crompton & Knowles Loom Works is applying it on orders from its customers.

The frictional surface of this clutch is provided with cork inserts, as shown in the loom

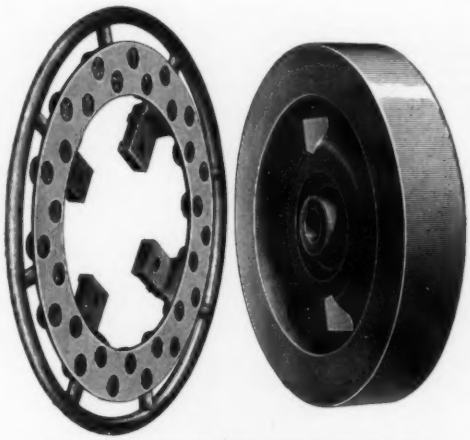


FIG. 1. A LOOM CLUTCH WITH CORK INSERTS.

clutch, Fig. 1, while the illustration of an automobile clutch, Fig. 2, and of a paper machine clutch, Fig. 3, with "Compo" surfaces are also of interest. The "Compo" pulley, Fig. 4, is also made with cork inserts, and tests of this pulley made at the Worcester Polytechnic Institute show an increase in the

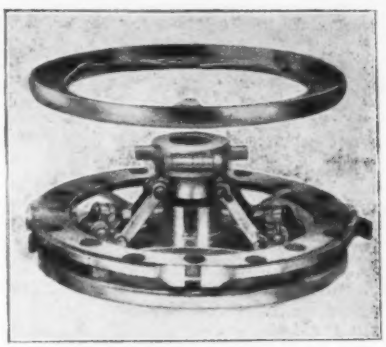


FIG. 2. AN AUTOMOBILE CLUTCH WITH CORK INSERTS.

power transmitted of 51 per cent. as compared with the plain iron pulleys.

The high coefficient of friction possessed by cork is well known, and this, combined with the durability of the cork inserts, gives

the "Compo" clutch and pulley its extraordinary merit and value.

Regarding the durability of cork inserts the following letter from the Stirling Mills of Lowell, Mass., written in January, 1903, is conclusive:

Lowell, Mass., Jan. 5, 1903.

Gentlemen:—In reply to your inquiry about cork insert pulleys at this mill, we have three, all put in in May, 1901, and so far they have given entire satisfaction. These pulleys are on a system to drive our picker room and the driving pulley is 30 inches in diameter, 8-inch face and transmits power to a shaft that runs one 40-inch double cylinder Burr picker, one 36-inch Davis & Furber picker, one 24-inch waste yarn machine, one 24-inch waste card and one 60-inch cone duster, and in addition we propose to run a 36-inch Sargent Burr picker, also double cylinder.

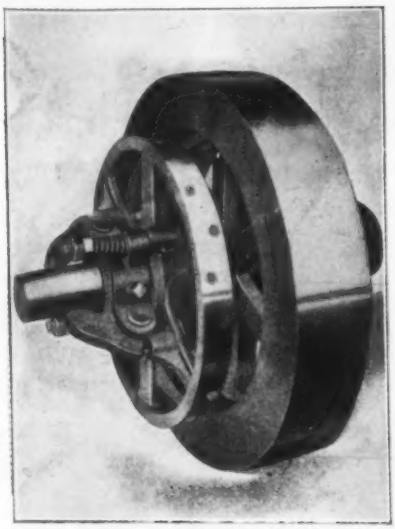


FIG. 3. A PAPER MACHINE CLUTCH WITH CORK INSERTS.

This load we think will be about 23 or 24 h. p., and from our experience of more than a year and a half we feel confident that the pulley will carry it without any trouble. We do not see that the corks have worn down any, and we know that they are today doing more work than when put in.

Yours respectfully,

A. F. Swanton.

These pulleys are apparently doing as good work at the present time (1906) as they were at the time the above letter was written.

A series of tests of "Compo" clutches for looms were recently made on a Crompton & Knowles loom at the Worcester Polytechnic Institute and show the following results:

Position of Clutch.	Pressure on Clutch	Torque	
		No. 1 "Compo" Clutch with Cork Inserts	No. 2 Leather-Faced Clutch
Average Results of Eight Positions	89.5 lbs.	19.50	16.95
ditto	151.5 lbs.	34.20	17.66
ditto	213.0 lbs.	46.43	23.09
ditto	275.0 lbs.	57.05	29.46
ditto	337.0 lbs.	73.33	36.09
ditto	398.0 lbs.	82.24	41.31
ditto	460.0 lbs.	96.48	47.56

Torque measured in Pound Feet.

Worcester Polytechnic Institute.
Test made by C. M. Allen.

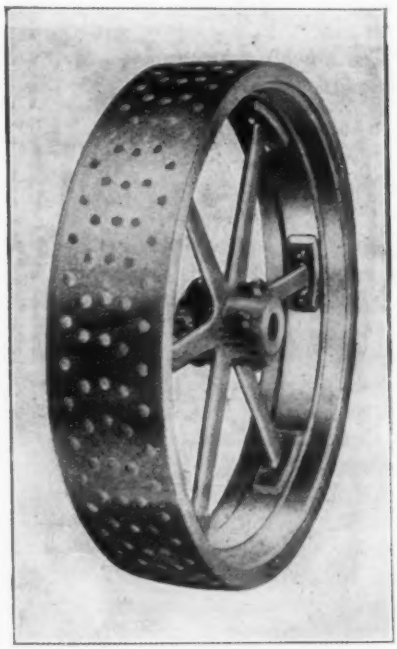


FIG. 4. A PULLEY WITH CORK INSERTS.

The torque is measured in pound feet. The test shows that with a pressure of 151 1/2 pounds and above, the efficiency of the "Compo" clutch was practically double that of the leather faced clutch. The great superiority of the "Compo" clutch as here shown is bound to result in its rapid adoption for textile machinery generally. The following extracts from letters from textile mills speak for themselves and show the good results obtained with "Compo" or cork insert clutches.

Brightwood Mfg. Company: "We have run 22 looms with your friction clutches for the last three years and have not had a cent's worth of repairs on these clutches. We like them very much. . . . Have consulted the weaving overseers and all the loom fixers and they are of the same opinion."

Glen Worsted Mills: "Our looms equipped with the 'Compo' friction clutch have proven very satisfactory; in fact, never have been repaired since we run them."

Liberty Silk Company: "We find that the 'Compo' friction clutch with cork inserts has the advantage that the loom reaches its full speed more rapidly than with the ordinary leather faced clutch and we are pleased to recommend it."

Geo. H. Gilbert Mfg. Company: "Would say that we like this clutch better than that with leather facings. We think there is less breakage in the driving gear with it than there is when we use the leather facings. What experience we have had with these clutches has been satisfactory."

Shirreffs Worsted Company: "We find the 'Compo' friction clutch all you claim for it."

Wm. Tinkham Company: "The 31 looms we have equipped with 'Compo' friction clutches have given very good satisfaction,—much better than the leather, as they are not affected by water, oil or atmospheric changes."

The "Compo" clutch and brakes have also been adopted by many leading automobile manufacturers, and among the cars which will be thus equipped in 1907 are the Studebaker, Cleveland, Ranier, Mack Bros., Commercial Vehicles, the well known air-cooled Marmon, the Aerocar, the Autocar (of which already some 3,000 cars so equipped have been delivered) and some ten or fifteen other well known lines.

The National Brake & Clutch Company do not manufacture either clutches or pulleys, but license others to manufacture and sell clutches and pulleys so fitted.

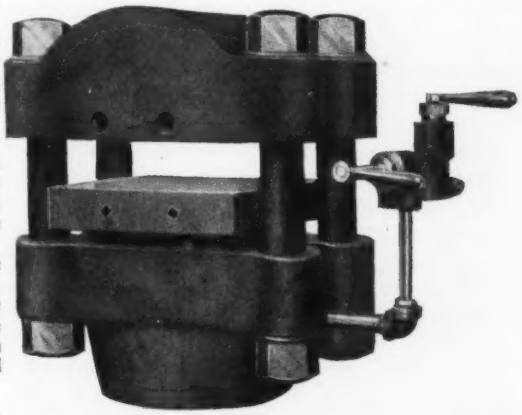
With the advantages of cork inserts in clutches and pulleys thus demonstrated in practice, every textile manufacturer will wish to investigate thoroughly for himself this new device for transmitting power.

In the year ending June 30, 1905, the Philippine Islands imported from the United States merchandise to the value of $6,200,620; their exports to the same country for that period were valued at $12,657,904.

It is estimated that for the year 1900 the capital invested in the woolen industry of the United States amounted to $392,040,353, and the value of the manufactured products to $392,473,050.

A NEW LINE OF PRESSES.

The illustrations show the general design of the hydraulic presses built by the Aiton Machine Co., 126 Liberty St., New York. The cuts show a 12-inch by 12-inch press.



Besides hydraulic presses they have added a full line of knuckle, hand and belt driven presses. This company are large builders

of wire and rubber cabling and insulating machinery, also rope machines, spool stranding machines and other textile specialties.

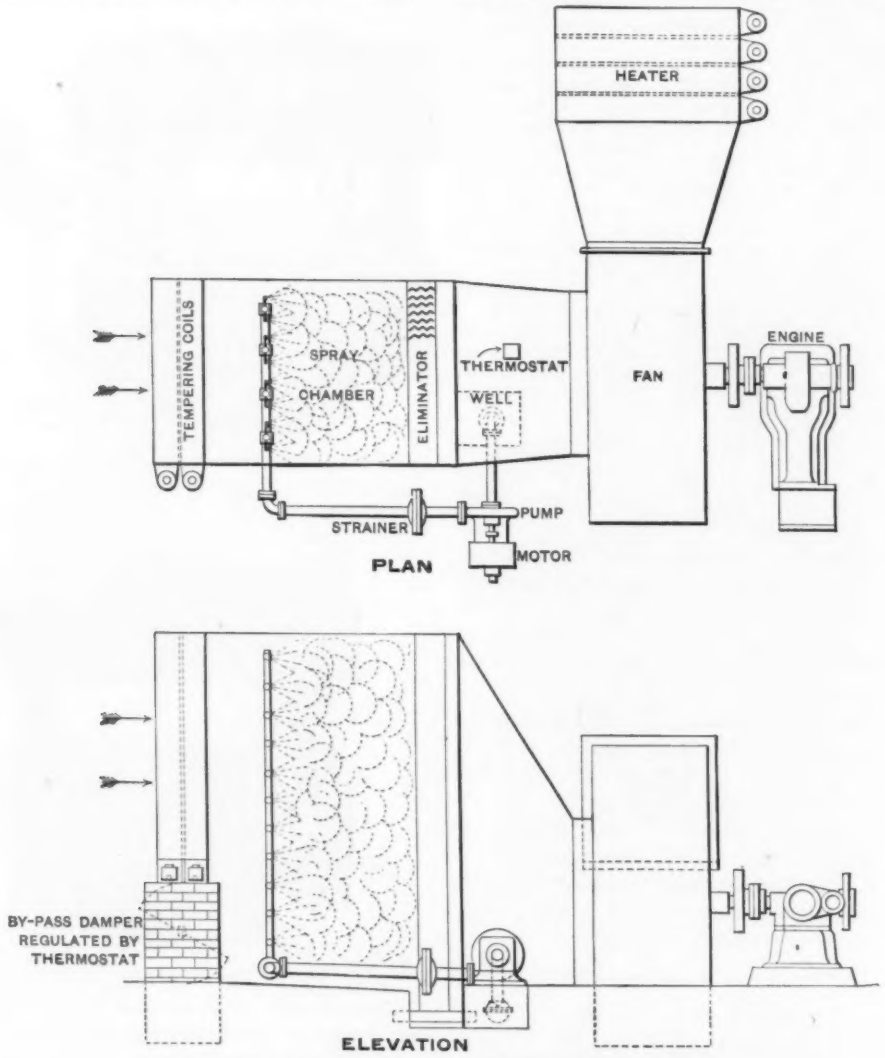
According to the census of 1900 there were 5,719,137 persons employed in the manufacturing industries of the United States in that year. The capital invested amounted to $9,846,628,564, and more than half of it was in the states of New York, Pennsylvania, Ohio, Massachusetts and Illinois.

AN AIR WASHER AND HUMIDIFIER.

The Buffalo Forge Company have recently perfected a system of purifying and humidifying the air, which is giving very satisfactory results for a wide variety of purposes. In textile mills the control of the humidity is of the greatest importance. The Buffalo Forge Company are confident that their system affords a simple means for supplying and regulating the humidity for textile work. They state that by a special arrangement the humidity can be kept at any desired degree up to 100 under varying conditions of weather.

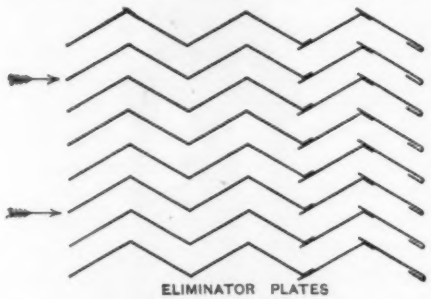
This system of humidification is a part of the Buffalo system of heating and ventilating, so that the air is kept at the proper condition while the mill is warmed and ventilated. The Buffalo humidifier discharges the water in the form of a cone by which the moisture is distributed, the water being thoroughly atomized within the nozzles.

The spray nozzles are of brass and of



BUFFALO AIR PURIFIER AND HUMIDIFIER.

simple construction. The action of the water prevents the openings from becoming clogged and the caps are easily removed when the nozzles are to be cleaned. After the air has been moistened and cooled by the



ELIMINATOR PLATES

water it is necessary to remove all free particles. This is done by an eliminator of novel design. It is said that not the slightest trace of free moisture can be found in the air after passing through the Buffalo eliminator. The spray system can be operated directly from street pressure, although it is usual to pump the water.

Canada has the best and richest mines of asbestos and corundum in the world.

THE DRAPER SPOOLER.

The accompanying illustration shows an improved spooler built by the Draper Co., Hopedale, Mass. Their regular model has been a leader for years and is still supplied to those who desire it. During the last two years the Draper Co. have introduced a great many double belt and chute spoolers used in connection with the Rhoades side discharge bobbin holder.

In these two spoolers they also incorporated a new patent traverse motion of entirely original design, which has proved so acceptable that they are put on all new spoolers when so ordered. Old spoolers, however, cannot be changed. This device does away entirely with lifting rods, and the rocker-arm motions for operating them.

Not only does it do away with all trouble from lifting rod sticking, but it gives the yarn a continual motion lengthwise of the spooler guide, keeping it free from lint and thereby saving trouble in cleaning guides, breaking of yarn, and the incidental tying of extra knots. The guides are not worn in ridges as with the ordinary pattern under certain conditions of use. It often happens that people

A NEW MODEL DRAPER SPOOLER.

never appreciate the disadvantages of an old system until they have a new one with which to compare it. In this case, the users are demonstrating the merits of the Draper devices. Purchasers of new spoolers can also have their choice of bobbin holders, side spindles, traveling belts, back chutes, or no chutes, as desired. Special arrangements for special uses include spoolers with skewers for cops with friction rolls, spoolers for worsted mills, etc.

IMPROVED APPLIANCES FOR USING EXHAUST STEAM.

The accompanying illustrations show the automatic relief valves and vacuum pump

FIG. 1.

manufactured by Harry F. Murphy & Co., 25 North 7th St., Philadelphia, Pa., and by

FIG. 2.

means of which exhaust steam can be used for heating buildings, boiling liquor, and drying materials without back pressure on the engine. This result is accomplished by creating a vacuum on the return or drip pipes instead of a pressure on the supply pipes. The vacuum pump, Fig. 3, is connected with the main return or drip pipe, and

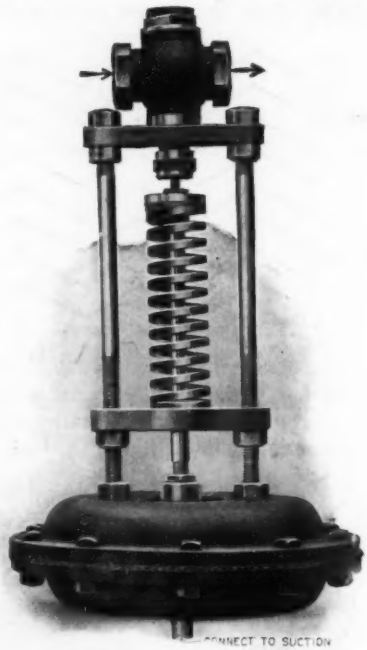


FIG. 3.

the return end of each radiator or coil is equipped with a specially designed automatic valve, Figs. 1 and 2, which allows the free passage of air and water and prevents the flow of steam into the return pipes. By an arrangement of this kind the air and water are drawn out of the radiators and coils, and the vacuum maintained in the return between the automatic valves and the vacuum pump.

These specialties have been thoroughly tested in a number of large plants. Figs. 1 and 2 show patterns of the automatic relief valves, which are connected to the radiator and coils. Fig. 1 is an angle pattern. It is constructed entirely of metal and is easily accessible without disturbing the connections. By removing the cap of the valve the entire inside can be lifted out. The valve is automatic, requiring no adjustment. It is made for 1 1/2-inch connections and when the valve is wide open it gives the full area of a

one-half inch globe valve, thus having sufficient capacity to drain the radiator or coil.

Fig. 2 shows the return ell pattern of the automatic valve. The construction is the same as the angle valve except that it is provided with an elbow at the outlet of the valve. The vacuum pump regulator, Fig. 3, is of the well-known type used for regulating tank pumps and is connected with the steam supply and the pump. The diaphragm is connected to the suction of the pump. When the vacuum exceeds the tension of the spiral spring the steam valve is closed by the action of the diaphragm and the pump stops. When the vacuum diminishes the spring opens the valve and the pump starts. The amount of vacuum carried on the returns may thus be regulated by increasing or decreasing the tension of the spring by turning the nuts on the uprights at the side.

A suction strainer is connected to the suction of the vacuum pump in order to prevent dirt and grit being drawn into the pump. The strainer is easily attached and is readily accessible for cleaning. The copper basket or screen can be quickly removed and replaced if necessary by simply taking out the plug in the top of the strainer. The strainer is always placed in an upright position close to the pump.

Harry F. Murphy & Co. control this system and they state that they are prepared to give full information in regard to the general arrangement of the system, and when it is desired prepare plans and specifications covering the installation of vacuum system heating and drying apparatus.

THE LATSHAW STEEL SPLIT PULLEY.

The accompanying illustrations show two of the many types of the split steel pulleys made by the Latshaw Pressed Steel and Pulley Co., Pittsburgh, Pa. This pulley has been designed after careful consideration of the requirements of a pulley for mill work. It is made of the best mild steel and weighs

THE LATSHAW PULLEY 8-ARM TYPE.

about one-half as much as the cast iron pulley. Among the claims made for it are the following: Saving of power, perfect grip on the shafting, safety at high speeds. It is adapted for both single and double belts and is bushed to fit shafts of any size.

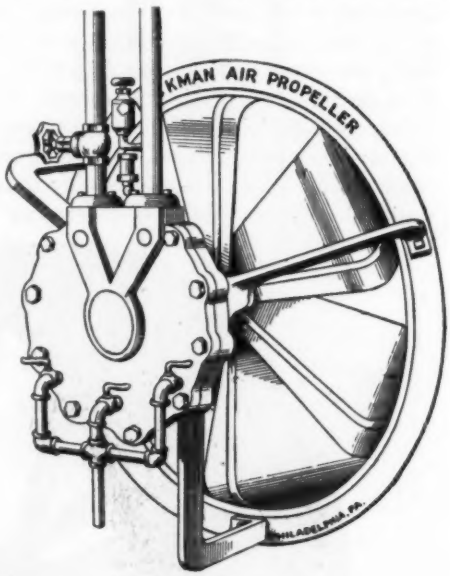
The Latshaw pulley is built in halves and consequently can be applied without stripping the shafting. It is held by compression alone, this being obtained by a large number of compression bolts. All pulleys from 14 to 24-inch face are provided with double arms, which eliminates all danger of collapse. The resistance offered by the air to the steel spokes is very small. The hub is so designed that set screws can be used if desired. The pulley has been designed with a strong hub, a mechanically correct spider and a light rim to meet practical requirements.

The Latshaw pulley is made in all standard sizes from 12 to 50-inch diameter and 3 to 24-inch face. The rim of each half section is made of one piece of solid steel. The hub is made heavy enough to support the compression bolts.

The Latshaw company carry a large stock of pulleys so that purchasers can obtain any desired size at short notice. They are confident that they are offering the trade the best steel pulley built and invite correspondence in regard to its merits.

ECONOMICAL VENTILATION.

The Blackman fan is driven by belting, eiectric motor, or direct connected steam engine. As high pressure steam is usually available in every part of the mill the method of driving by direct connected engines is well



adapted for textile mills. In dye houses, drying and finishing rooms, where transmission of power by belt is difficult if not impossible, the direct connected engine is espe-

cially serviceable. The engine connected with the Blackman fan is of the reciprocal type and has four pistons that require no packing. Its durability has been demonstrated by many years of use.

This fan is manufactured by E. M. Nichols, 639 Arch St., Philadelphia, Pa., who invites manufacturers to consult him regarding the various problems in ventilation that may arise in their mills.

A NEW PICKER MECHANISM FOR KNITTING MACHINES.

The accompanying illustration shows a picker mechanism designed for "two-and-

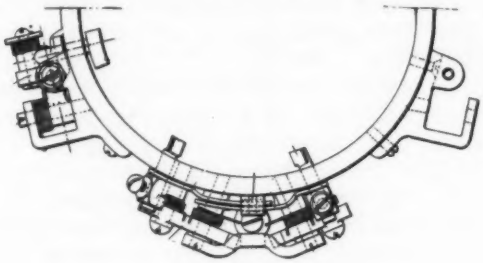


FIG. 1.

one" work, for which during the widening process two raised needles are lowered by each drop picker action and one raised by a lifter picker on the reverse movement. With the new device co-operating pickers are used. The drop pickers are left free of controlling devices, while the lifter pickers are controlled automatically so as to cause the lifting action of each of the lifter-pickers to effect the locking in final inoperative position and the simultaneous setting of the other lifter-picker into operative position.

Fig. 1 is a partial plan view of a cam-cylinder of a knitting-machine, showing the improved picker mechanism. Fig. 2 is an exterior elevation of the same developed upon a plane and showing one of the drop-pickers and one of the lifter-pickers in raised position and the others in depressed position. Fig. 3 is a separate view of one of the drop-pickers.

A picker mechanism comprises a pair of drop-pickers, each of which, as shown, is independent of controlling devices and arranged to be directly operated by the needles. There are a pair of lifter-pickers, each of which, as shown, is controlled by an automatic locking device.

The needle-engaging arm is swung with the main arm around the pivotal point in carrying down the needles engaged by the terminal finger as indicated in Fig. 2, while on the reverse movement of the cam-cylinder, as shown, the needle-engaging arm is moved vertically downward out of the way of the passing needles, its swing upon the pivotal connection to the main arm being approximately in a vertical plane radial to the cam-cylinder.

In reciprocating the cam-cylinder during the widening operation the needle-finger of each drop-picker engages two idle needles and is momentarily swung downward to lowered position, as indicated to the right of Fig. 2, lowering said needles into action, the raised needles thereafter merely depressing the drop-picker arm, see Fig. 3, in the plane until two additional needles are to be lowered.

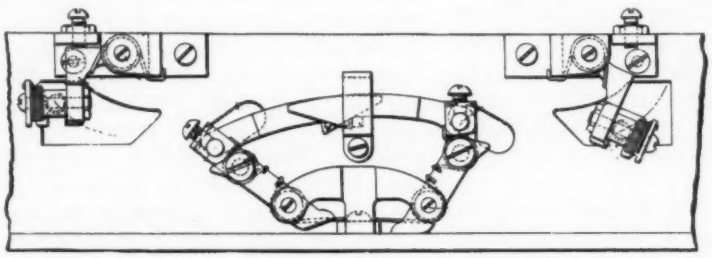


FIG. 2.

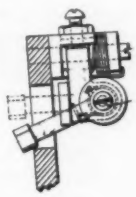


FIG. 3.

During circular knitting the lowered needles pass under the usual fixed cam on the cylinder upon which the lowered lifter-picker rests, so that there is no contact of the needle-hubs with the lifter-picker and no wearing action whatever upon either picker.

Dyeing, Bleaching, Printing, Etc.

INFLUENCE OF VARIOUS CHEMICALS ON THE FELTING PROPERTIES OF WOOLEN YARNS.

BY JOHN TEBBETTS.

(Winner of the Textile World Record Gold Medal at the Philadelphia Textile School.)

By the term felting is to be understood the interlocking of wool fibres with one another. This effect is possible by reason of the wool fibre being constructed in such a manner that on the surface there is a layer of overlapping scales, the arrangement of which may be likened somewhat to that of tiles on a roof or of scales on a fish. The edges of these scales project more or less from the surface of the fibre, and consequently the edge of the fibre itself presents a somewhat serrated or saw-tooth appearance. The felting property of wool is due to the interlocking of these external scales, and naturally, the greater the projection of the edges of the scales the greater will be the felting action.

In some wools the free edge of the scale projecting from the fibre is relatively small, whereas in others it is quite large; wools of the former class would not possess good felting properties, while wools of the latter class would felt easily. There are some grades of wools in which the scales on the surface fit closely together and lie flat on the fibre, so there is practically no projecting edge at all; such wools, of course, would be of the non-felting class.

The felting of wool is brought about by two agencies. The principal one is physical, and is the rubbing of the fibres together by mechanical action. This forces the projections of the surface scales into one another and binds the fibres firmly together. This action is carried out in the usual process of fulling or milling. On the other hand there are chemical agencies which appear to aid considerably in the felting by reason of their action on the scales of the fibre, causing them to open up more freely and thus present a greater number of projecting edges. It is well known that many of the operations of scouring, bleaching, dyeing, etc., of wool cause the fibre to become more susceptible to felting. It is presumed that the various chemical agencies employed in these operations have the effect of opening the scales, as it were, thus increasing the felting property. It is the purpose of the present paper to study the action of the principal chemicals employed in connection with wool to see just what their effect may be with reference to the felting of the fibre.

In studying this question skeins of woolen yarn of uniform composition were made up, each skein approximating 75 grains in weight. The lengths of the skeins were then accurately measured, for which purpose they were stretched uniformly by being suspended in a vertical position with a four-ounce weight attached. After being measured the skeins were treated with various solutions contained in baths holding 10 ounces of liquid; the treatment was continued for half an hour at the required temperature, during which time the skeins were systematically turned in the solution so that each skein received approximately the same mechanical treatment. The skeins were then squeezed through a wringer and dried, after their lengths were measured again in the same manner as at first. Three duplicate tests were made in each case in order to obtain an average. The percentage of shrinkage in length of the skein was taken to represent the degree of felting, because the shrinkage is due, no doubt, to the felting of the individual fibres. In this manner a comparison was obtained as to the degree of felting caused by various solutions acting on the wool fibre. That these figures have any absolute value as to practical work is to be doubted, but they will no doubt serve as relative values between the different chemicals employed.

The following tables show the results obtained.

TABLE I.—ACTION OF WATER.

No. Test.	Temp. °F	Length of Skeins. inches. Before.	After.	Shrinkage in %
1	60	25.62 25.25 26.00	25.62 25.25 25.88	0.15
2	140	25.75 26.25 26.00	25.63 26.12 25.88	0.46
3	180	25.50 26.00 25.62	25.30 25.88 25.42	0.67
4	212	25.75 26.25 25.46	25.50 26.00 25.00	1.24

Examination of Table I. will show that with cold water (the temperature of ordinary tap water) the amount of felting in the wool is practically zero. The degree of felting increases gradually as the temperature rises, until at the boil it amounts to one and one-quarter per cent.

TABLE II.—ACTION OF SODA ASH.

No. Test.	Soda Ash, ounces per cu. ft.	Temp. °F.	Length of Skein. Inches. Before.	After.	Shrinkage in %
5	.5	140	25.75 25.50 26.00	25.50 25.25 25.88	0.8
6	5.0	140	26.00 25.75 26.00	25.63 25.30 25.60	1.4
7	5.0	212	25.62 26.25 25.50	24.00 25.63 25.00	4.3

TABLE III.—ACTION OF SULPHURIC ACID.

No. Test.	Sulphuric Acid parts per thousand by volume	Temp. °F.	Length of Skein. inches. Before.	After.	Shrinkage in %
8	0.1	160	25.75 26.25 25.50	26.00 26.50 25.25	0.9
9	0.5	160	25.75 26.25 25.62	25.50 26.00 25.50	0.8
10	1.0	160	26.25 25.50 25.62	25.50 25.00 25.25	1.4
11	2.0	160	26.12 26.75 26.50	25.88 26.50 26.00	1.2
12	1.0	180	25.62 25.75 26.25	25.25 25.25 26.00	1.4
13	1.0	212	26.50 26.00 26.50	25.50 25.50 26.00	2.6

Table II. shows that even very dilute solutions of soda ash employed at a temperature of 140° F. (that usually employed in scouring) have an appreciable felting action over that of water at the same temperature, but the action, however, at this temperature is very small. More concentrated solutions increase the felting action to quite a degree; but elevation of the temperature to the boil causes the solution of soda ash to have a very marked felting action.

TABLE IV.—ACTION OF GLAUBER SALT.

No. Test.	Glauber Salt ozs. per cubic ft.	Temp. °F.	Length of Skein Inches. Before.	After.	Shrinkage in %
14	1.0	140	26.50 25.75 26.00	25.88 25.50 25.68	1.5
15	5.0	212	25.88 26.50 26.25	25.00 26.00 26.00	1.4

TABLE V.—ACTION OF ALUM.

No. Test.	Alum ozs. per cubic ft.	Temp. °F.	Length of Skein. Inches. Before.	After.	Shrinkage in %
16	1.0	140	26.00 26.25 25.75	25.50 26.00 25.62	1.1
17	1.0	180	26.50 25.50 26.00	26.00 25.12 25.75	1.4
18	2.0	212	26.00 26.50 25.75	25.75 26.00 25.25	1.6

Table III. shows that solutions of sulphuric acid at 160° F. have practically no felting action on the wool; even at 180° F. the action is negligible. At the boil the action becomes appreciable but is not at all excessive, falling far below that caused by solutions of soda ash.

TABLE VI.—ACTION OF CHROME.

No. Test.	Chrome ozs. per cubic ft.	Temp. °F.	Length of Skeins. Inches. Before.	After.	Shrinkage in %
19	1.0	140	26.00 25.88 26.25	25.75 25.63 26.00	0.9
20	1.0	180	26.00 26.30 26.25	25.62 26.00 26.00	1.1
21	2.0	212	26.00 26.00 26.38	25.50 25.68 26.00	1.5

Table IV. shows that the felting action of Glauber's salt even in boiling solutions is practically negligible.

Solutions of alum also appear to have no special felting action even at the boil, as shown in Table V.

Solutions of chrome do not appear to exert any felting action, even when employed at a boiling temperature, the degree of shrinkage not being any greater than with water alone, as is shown in Table VI. The same is also true for solutions of coperas and bluestone, as is shown in the following tables of results.

TABLE VII.—ACTION OF COPPERAS.

No. Test.	Copperas ozs. per cubic ft.	Temp. °F	Length of Skeins. Inches		Shrinkage in %
			Before.	After.	
22	1.0	140	25.88 25.88 26.12	25.75 25.63 26.00	0.7
23	1.0	180	25.88 26.25 25.75	25.25 26.00 25.63	1.3
24	5.0	212	26.12 26.50 25.75	25.75 26.00 25.50	1.4

TABLE VIII.—ACTION OF BLUESTONE.

No. Test.	Bluestone ozs. per cubic ft.	Temp. °F.	Length of Skeins. Inches.		Shrinkage in %
			Before.	After.	
25	1.0	140	26.00 26.25 26.75	25.88 26.00 26.25	1.1
26	1.0	180	25.88 26.50 26.25	25.25 26.00 26.00	1.7
27	5.0	212	26.12 26.50 26.75	25.75 26.00 26.12	1.8

Although the results of these tests are for the most of a rather negative character, nevertheless they serve to demonstrate that solutions of the ordinary metallic salts employed as mordanting agents for wool do not possess in themselves any felting action on the fibre. The solutions of alkalies and acids, on the other hand, do possess in a slight degree a felting action especially at high temperatures, though at the concentrations and temperatures employed in scouring and dyeing it cannot be said that this felting action is at all appreciable. It must be concluded that the felting of wool in any of these operations is due almost exclusively to the mechanical action of rubbing between the fibres. That the solutions of chemicals, especially in the case of alkalies and acids, influence the degree of such felting is not to be doubted, but that they cause the felting per se has not been demonstrated.

CARBONIZING WOOLENS.

The object of carbonization is to free wool from accidental contamination with vegetable matter, which may take various forms, such as straw, burrs, or fibres from wrappings. The carbonization may be done at almost any stage of the finishing. It may be the first process of all, before scouring, or it may come after raising, milling, or dyeing. One advantage of putting this process first is that in this case the wool is protected by the spinning oil and is less likely to be damaged. Nevertheless goods carbonized before scouring never dye so well as those carbonized subsequently and carbonization, therefore, should not be done before scouring, except in the case of thin woolens to be dyed black. Again, it is evidently easier to carbonize unfelted than felted wool, that is, to carbonize before milling; but there is here, too, a reverse side to the shield. Goods milled after carbonization take longer milling and make a great deal more waste. On the whole the best time to carbonize is after raising, which loosens the fibre and enables the carbonizing liquids to penetrate better.

In considering the advisability of carbonizing after dyeing, the nature of the dye must naturally be a determining factor. The liquids used act on many dyes. Again, it must not be forgotten that carbonization makes for level dyeing, by making the constitution of the fabric more homogeneous.

Carbonization is done with sulphuric or hydrochloric acid, or a mixture of the two, and also in the case of wool-yarn-dyed goods with chloride of aluminium or magnesium. The goods are steeped in acid by means of a jigger, the vat of which is of glass or cement, or of wood lined with lead. In any case it must be free from alkali or soap, which would destroy part of the acid. The acid is used from 5° to 9° Tw., and care must be taken to work the goods through it till they

are thoroughly soaked. They are then drained and centrifuged. Great pains must be taken to keep the goods from light, especially the direct rays of the sun, while they are awaiting drying, and while they are drying. The scouring and drying should be done in rooms with ground-glass windows and as dark as is compatible with proper work. There seems little doubt that the actinic rays produce peroxide of hydrogen from the acid as long as it is in contact with animal fibre. At all events, the scoured fabric will not dye evenly if it has been exposed to much light. Heat also must be avoided, so that the goods should be covered up if they have to wait. Again, they should not be hung up, and, if piled, the pile should be turned upside down frequently. The object of these precautions is to prevent acid accumulating by gravitation in parts of the fabric, where it not only tenders the goods but makes those places dye differently from the rest.

From what has just been said it is evident that a vast amount of trouble and danger is saved by taking the goods direct from the centrifugal to the drying room to undergo the second and final stage of the carbonization. If the drying is done in a drying room all accumulation of acid in places must also be avoided. Where the goods turn to cross the drying room from one side to the other, they should be bent at a right angle and not at an acute angle. If there are any sharp creases the acid will be unable to evaporate in these places and will act more there than elsewhere. It is obvious, too, that the goods should cross the room horizontally and not hang vertically from ceiling to floor.

The temperatures used are 100° to 120° F. at first and 140° to 170° F. towards the last if sulphuric acid has been used. With aluminium chloride we begin with 100° to 120° and gradually raise the heat to the boiling point. The time in the drying room varies from three to six hours, according to the weight of the goods and the amount of vegetable fibre to be destroyed. The room must be thoroughly ventilated to get rid of the vapors as fast as they are produced. Cylinder drying machines are often used, but the drying room is on the whole better, as the drying machine hardens and stiffens the goods.

The goods are next rinsed to free them from remaining acid. In a properly managed factory this can be done as soon as the drying is over. If unfortunately the goods must wait for neutralization they must be protected from damp and light throughout the interval.

Many processes have been proposed for carbonization. It has been suggested that metallic salts should be added to the acid bath, the advantage supposed to be gained being that they protect the wool from the acid. This addition is, however, quite superfluous, and if the process is properly carried out—if the acid is neither too strong nor too weak, the drying neither too hot nor too long and the rinsing thorough—the wool is increased in strength and requires no protection of any kind. The sulphates of zinc and alumina have been specially recommended for this purpose. All have the great disadvantage that they are apt to leave behind insoluble matter, which makes proper milling or dyeing practically impossible.

The rinsing is done first with clean water, and then with carbonate of soda solution of 4° to 10° Tw. The goods should be lifted when the soda is put in, as if the strong solution touches the goods it will produce soda stains. Aluminium chloride is used in the form of a solution of 9° to 10° Tw. in strength. After impregnation the fabric is centrifuged and dried first for some hours at 120° F. and finally at 300° F. Magnesium chloride solution is used at from 7° to 9° Tw. strength. The impregnation lasts about half an hour. The goods are then centrifuged and dried at the same temperature as with aluminium chloride. Hydrochloric acid gas has also been used in the dry state, and at a temperature of about 250° F., for carbonizing fabrics.

It is sometimes necessary to free half-wools from burrs and straws by carbonization. Obviously in this case carbonization by acid cannot be resorted to. Instead of acid, soda water-glass is used. Three baths are used, each of 600 gallons, and made as follows:—

1.—Water-glass	.....	30 lbs.
Ammonia	.....	2 lbs.
Soap	.....	2 lbs.
2.—Water-glass	.....	20 lbs.
Ammonia	.....	1 lb.
Soap	.....	2 lbs.

The temperature of each of these two baths is about 120° F. The third bath consists of concentrated water-glass of 28° to 42° Tw., and must not be more than lukewarm.

After leaving the third bath the fabric is dried and then passed between cast-iron rollers to beat out the dust of crushed burls and dried water-glass.

The use of burling tinctures to avoid the necessity for carbonization by dyeing the vegetable fibres to match the wool will be alluded to later, as will that of carbonizing tinctures, which are merely concentrated carbonizing liquids with which the burls of cotton threads in the fabric are padded. The goods are then dried and brushed.

The carbonizing machines are merely combinations of the three sets of apparatus —the soaking vat, the drying room or cylinders, and the rinsing apparatus.—R. Shawcross in Dyer and Calico Printer.

TURKEY-RED DYEING.

Turkey-red dyeing is an empirical discovery, and although many chemical investigations of it have been made, no complete scientific explanation of the process has as yet been arrived at. Analyses of Turkey-red dyeings show that their chief constituents are alizarine, lime, alumina, and fatty acids. These four are always present, but in very varying proportions. Tin compounds, although much used for brightening the red, are not essential. It is known that the alizarine forms a lake with the lime and alumina, but the part played by the fatty acids is not as yet understood.

The process is briefly as follows. The cotton is first scoured to free it from dirt, size, etc., and must also be bleached for dyeing pale reds. It is then impregnated with Turkey-red oil. This is of various qualities and composition, and has, of course, great influence on the result. Turkey-red oil is made by the action of sulphuric acid on castor oil, and contains about 50 per cent, of fatty acid. It disolves in water to a slightly turbid solution. The Turkey-red oil must not be too alkaline, or it will not fix well on the cotton. Turkey-red oil D, which is chiefly used for printing, is made by action on castor oil with caustic soda lye.

The cotton must be well worked in the oil bath to secure complete and uniform penetration, without which both mordanting and dyeing will be unlevel. The centrifuging, or wringing, must also be carefully done, or it will disturb the even impregnation before existing. The cotton is next dried, taking care to fix the oil by having a fairly high temperature acting for a considerable time. Neglect of this will prevent proper fixing of the alumina, and the colors will rub off. The cotton is now mordanted with acetate of sulphate of alumina, alum being rarely used. The commercial salt employed is an acetosulphate, or rather a mixture of acetate and sulphate. The composition of the mordant depends upon the nature of the material to be dyed, the character of the water used, on the quality of the Turkey-red oil, and upon the shades to be dyed. It must in any case be free from iron, which will form a violet alizarine lake and spoil the color. Insoluble iron compounds, such as rust, are less injurious, but they dissolve to some extent in the mordant. The alumina is fixed upon the fibre partly by the oil and partly by the decomposition of the alumina salts by the heat of the drying room. The fixing is completed by the next step, the chalking. This is followed by thorough rinsing.

Next comes the dyeing, and this is done with hard water, i. e., water containing lime. The water must be of from 5° to 8° of hardness, and soft water is brought up to this point with lime water or solution of calcium acetate. There must not be too much lime in the water, however, as an excess deadens the shade. There must be no soluble iron in the water, but as the bath is alkaline insoluble iron compounds do no harm. The dyeing is done at the boil, or in a bath of 60° to 65° C., followed by a fixing with steam. This second method gives much brighter colors than the boiling process. The steaming is

done at the atmospheric pressure, or at an excess of from half to a whole atmosphere according to circumstances.

The brightening consists of getting rid of unfixed dye. It is usually done with a soap bath, with or without soda. To this bath tin-salt, or other tin compounds, are sometimes added, which, by forming a tin lake, make the shade yellower and brighter. Olive oil is also much used in a bath, wherein it is gradually saponified by soda. The bluish alizarine brands are decidedly faster to alkalis and soap than the yellowish brands, and the brightening process cannot therefore be carried so far with the latter as with the former.

The dyed and brightened goods must be dried at a low heat, as too rapid drying makes the shade dull and brownish, but in time the wrongly dried goods recover their original appearance.

For dyeing on an alumina mordant, alizarine red in paste is the dye most used, but purpurine, alizarine orange, anthracene blue, coeruleine, anthracene brown, alizarine yellow G, etc., are also used.

Cotton yarns dyed with Turkey-red are very largely used where fabrics have to be made possessing much fastness to light and washing; in short, in all cases where a fast red is a desideratum.—Faerberei and Appretur.

Color Cards.

Blue Shades on Ladies' Dress Materials and Gentlemen's Suitings; Cassella Color Co., 182 Front St., New York City.

A large folder containing forty-eight samples of woolen piece goods in various styles and weights colored different shades of blue with the dyestuffs manufactured by this company. Several of the samples have striping threads of a contrasting color that were not colored with the blue dyes.

Metachrome Colors. Berlin Aniline Works, 213 Water St., New York City.

A folder containing thirty-six samples of loose wool dyed different shades with Metachrome Browns, Yellows and Bordeaux.

Diamond Phosphine. Cassella Color Co., 182 Front St., New York City.

A card showing various shades of Diamond Phosphine G G, P G, R and D on cotton yarn and cotton piece goods. Full directions are given for dyeing and printing.

Anthracene Chrome Blue. Cassella Color Co., 182 Front St., New York City.

A card showing ten shades of Anthracene Chrome Blue B W and R R W on woolen yarn, piece goods, raw wool and slubbing.

Immedial Yellow G G; Cassella Color Co., New York City.

Two samples of cotton yarn and two of cotton piece goods showing 2 and 4 per cent. dyeings with Immedial Yellow G G.

DYE RECIPES.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 129.

Green on Worsted Yarn.

Sulpho Green J on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Sulpho Green J.
(Walter F. Sykes & Co., 85 Water St., New York City.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter at 150° F., and dye at a boil for one hour.

Sulpho Green J possesses excellent fastness to light and sulphur bleaching and is especially adapted for dyeing yarns for carpets, as well as fine woolens.

Recipe No. 130.

Blue on Worsted Yarn.

Anthracene Chrome Blue B W on 100 lbs. chromium mordanted yarn. First mordant the yarn in a bath containing

3 lbs. Potassium Bichromate,
2½ lbs. Tartar

at a boil for one and one-half hours, and then dye in a bath made up with

3 lbs. Anthracene Chrome Blue B W.
(Cassella Color Co., 182 Front St., New York City.)
2 lbs. Acetic Acid,

entering the yarn at 110° F., raising to a boil, in from one-half to three-quarters of an hour, and then dyeing at a boil for one and one-half hours.

During the last half hour of the dyeing

3 lbs. Acetic Acid

should be added to complete the exhaustion of the dye bath.

Recipe No. 131.

Black on Cotton Yarn.

Sulphur Black A W Extra on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Sulphur Black A W Extra.
(Berlin Aniline Works, 213 Water St., New York City.)
14 lbs. Sodium Sulphide (Crystals).
10 lbs. Soda Ash.
70 lbs. Glauber's Salt.

Bring bath to boil, and dye at a temperature just below a boil for one hour.

Sulphur Black A W Extra gives a black of excellent color and fastness and it differs from most sulphur colors in that it does not have to be dissolved separately with sodium sulphide.

Recipe No. 132.

Red on Worsted Yarn.

Chrome Fast Red R on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Chrome Fast Red R.
(Berlin Aniline Works, 213 Water St., New York City.)
10 lbs. Glauber's Salt.
4 lbs. Acetic Acid.

Enter yarn at 140° F., raise to a boil and after boiling for three-quarters of an hour add

4 lbs. Sodium Bisulphate,

and boil one-half hour longer to exhaust the dye bath.

Then after-treat in a fresh bath containing

1½ lbs. Potassium Bichromate,
3 lbs. Acetic Acid,

for one-half hour.

Chrome Fast Red R, when after-treated in this way, is rendered faster to light, washing and fulling.

Recipe No. 133.

Blue on Cotton Yarn.

Tetrazo Fast Indigo Blue on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Tetrazo Fast Indigo Blue.
(American Dyewood Co., 154 William St., New York City.)
30 lbs. Common Salt.

Enter at 150° F., bring to a boil, and dye at a boil for one hour.

Tetrazo Fast Indigo Blue gives an excellent shade of blue possessing very good fastness to light.

Recipe No. 134.

Orange on Cotton Yarn.

Tetrazo Orange P Y on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Tetrazo Orange P Y.
(American Dyewood Co., 154 William St., New York City.)
30 lbs. Common Salt.

Enter yarn at 180° F. and dye at a boil for one hour.

Tetrazo Orange P Y gives an excellent shade of orange, which possesses the characteristic properties of the direct cotton colors.

Recipe No. 135.

Blue on Woolen Cloth.

Domingo Alizarine Blue X N on 100 lbs. woolen cloth. Prepare the dye bath with

8 lbs. Domingo Alizarine Blue X N.
(C. Bischoff & Co., 451 Washington St., New York City.)
10 lbs. Acetic Acid.
10 lbs. Glauber's Salt.

Enter at 140° F., boil three-quarters of an hour, and then exhaust the bath by the addition of

2 lbs. Sulphuric Acid.

Then after-treat for one hour in a bath made up with

3 lbs. Potassium Bichromate.

Domingo Alizarine Blue X N is an exceedingly level dyeing color and will be found excellent for the production of dark blues upon broadcloth, and in fact any kind of wool material. It also possesses very good fastness to washing and light.

Recipe No. 136.

Pink on Cotton Yarn.

Direct Red 10 B on 100 lbs. cotton yarn. Prepare the dye bath with

¼ lb. Direct Red 10 B.
(E. M. Thayer & Co., 411 Atlantic Ave., Boston, Mass.)
10 lbs. Common Salt.

Enter at 180° F. and dye at a boil for one hour.

Direct Red 10 B is a very level dyeing color and is particularly useful for shading purposes.

Recipe No. 137.

Seal Brown on Cotton Yarn.

Phenedine Cutch Brown 8243 on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Phenedine Cutch Brown 8243.
(Walter F. Sykes & Co., 85 Water St., New York City.)
30 lbs. Common Salt.

Enter at 140° F., bring to a boil and dye at a boiling temperature for 45 minutes.

Phenedine Cutch Brown 8243 gives an excellent shade of seal brown, possesses the characteristic properties of a direct cotton color, and exhausts the dye bath better than most of the direct cotton colors.

Recipe No. 138.

Blue on Woolen Cloth.

Domingo Blue B B on 100 lbs. woolen cloth. Prepare the dye bath with

4 lbs. Domingo Blue B B.
(C. Bischoff & Co., 451 Washington St., New York City.)
5 lbs. Formic Acid.
15 lbs. Glauber's Salt.

Enter cloth at 140° F., bring slowly to a boil and dye at a boil for one hour.

Domingo Blue B B will be found an excellent self color, as well as valuable for the production of compound shades upon heavy woolen and worsted cloth.

Recipe No. 139.

Violet on Worsted Yarn.

Guinea Fast Violet 10 B on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Guinea Fast Violet 10 B.
(Berlin Aniline Works, 213 Water St., New York City.)
4 lbs. Sulphuric Acid.
15 lbs. Glauber's Salt.

Enter at 150° F., bring slowly to a boil, and dye at a boil for one hour.

Guinea Fast Violet 10 B possesses very good fastness to light, alkalies and rubbing. It is very soluble and dyes evenly. It retains its fine bloomy shade of violet in artificial light.

Recipe No. 140.

Black on Woolen Cloth with Cotton Striping Threads.

Acid Black G S on 100 lbs. woolen cloth. Prepare the dye bath with

6 lbs. Acid Black G S.
(Read Holliday & Sons, 7 Platt St., New York City.)
2 lbs. Sulphuric Acid.

Enter the well wet out material cold, raise to a boil very slowly and then add

2 lbs. Sulphuric Acid.

Boil until cotton is clear. If cotton is not white enough add 2 lbs. more of acid and boil fifteen minutes longer. Wash and dry.

Recipe No. 141.

Red on Cotton Yarn.

Paranol Fast Red F on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Paranol Fast Red F.
(E. M. Thayer & Co., 411 Atlantic Ave., Boston, Mass.)
25 lbs. Common Salt.

Enter at 180° F. and dye at a boil for one hour.

Paranol Fast Red F is fast to acid and fairly fast to light. It dyes very level and is a good brightener.

Recipe No. 142.

Green on Cotton Yarn.

Immedial Deep Green G on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Immedial Deep Green G.
(Cassella Color Co., 182 Front St., New York City.)
10 lbs. Sodium Sulphide (Crystals).
5 lbs. Soda Ash.
40 lbs. Glauber's Salt.

Dissolve the color with sodium sulphide, and add to the dye bath which already contains the soda ash. Boil up. Add the Glauber's salt and dye for one hour at, or just below, the boil.

Immedial Deep Green G possesses excellent fastness to washing and acids, and very good fastness to light.

Recipe No. 143.

Red on Cotton Yarn.

Direct Red 10 B on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Direct Red 10 B.
(E. M. Thayer & Co., 411 Atlantic Ave., Boston, Mass.)
25 lbs. Common Salt.

Enter at 180° F. and dye at a boil for one hour.

Direct Red 10 B is a very level dyeing color, and is particularly useful for shading purposes.

Recipe No. 144.

Blue on Worsted Yarn.

Anthracene Chrome Blue R R W Extra on 100 lbs. chromium mordanted yarn. First mordant the yarn in a bath containing

3 lbs. Potassium Bichromate,
2½ lbs. Tartar,

at a boil for one and one-half hours, and then dyeing in a bath made up with

3 lbs. Anthracene Chrome Blue R R W Extra.
(Cassella Color Co., 182 Front St., New York City.)
2 lbs. Acetic Acid,

entering the yarn at 110° F., raising to a boil in from one-half to three-quarters of an hour and then dyeing at a boil for one and one-half hours.

During the last half hour of the dyeing

3 lbs. of Acetic Acid

should be added to complete the exhaustion of the dye bath.

Mill News.

Those interested in receiving early and more complete investigated information of projected new mills, enlargements, improvements, fires facts and gossip of the trade are referred to the Textile Advance News, issued weekly by the publishers of the Textile World Record, at $15.00 per year.

COTTON.

New Mills.

*Georgia, Crawford. L. F. Edwards, president and treasurer of the Mallison Braided Cord Co., Athens, Ga., states that they are building a yarn mill that is expected to be ready for production in April, 1907. They will make yarns on tubes and skeins, 8s to 16s, 2 and 4-ply; about 5,000 spindles; is to be a dye house. He does the buying at Athens. This project was reported in our issue of Aug. 17th under the head of Carlton, instead of Crawford.

*Georgia, Newnan. Plans and specifications have been prepared by A. F. Walker (Atlanta) for the new buildings for the McIntosh Mills. The main building will be 300 by 75 feet, two stories, brick and stone. Mill will be erected to accommodate 10,000 spindles for making white and colored yarns.

*Indiana, La Porte. F. W. MacDonald is secretary and manager of the La Porte Braiding Mills, capitalized at $50,000, and F. C. Mann, treasurer. Plant is operated on braids, but shoe laces will be principle production for some time to come.

Massachusetts, Athol. Wm. Lee, formerly of Otter River, has leased a factory on Freedom St., and will manufacture cotton rope and clothes line. The machinery is being set up and will give employment to about 30 persons.

*North Carolina, Charlotte. The contract for the erection of the new mill of the Mayes Manufacturing Company, J. H. Mayes, president, was awarded yesterday. The new mill will be located just across the Catawba River, about two miles from Belmont. Messrs. T. C. Thompson & Bros., the well-known mill contractors of Birmingham, Alabama, were awarded the contract, under the terms of which the building must be ready for the installation of machinery in four months. The new mill will begin operations about January 1, 1907. The company will manufacture fine yarns.

North Carolina, Gastonia. The Holland Manufacturing Company has been incorporated with capital stock of $50,000. G. A. Gray is president of the company; L. L. Jenkins, vice-president and D. M Holland, secretary and treasurer. They will establish a plant of 2,000 spindles, for making coarse yarns. Will operate by electricity.

*North Carolina, Lowell. The McAden Mfg. Co. of McAdensville, N. C., is reported as contemplating building a mill at this place.

*North Carolina, Spray. The German-American Company, which started operations Aug. 1st, in their new plant, has an equipment of 9,000 mule and 13,000 ring spindles, with 300 broad looms, making yarns and cotton textiles. This plant is capitalized at $1,000,000, with B. Frank Mebane, president; A. C. Phelps, vice-president and general manager; Arthur J. Draper, treasurer and W. E. Fearrington, superintendent. Plant is run by steam. A dye house is to be installed later.

*North Carolina, Winston. A. B. Saunders, recently reported as interested in a cotton mill project, expects to organize a company with a capital stock of $100,000, to build a 5,000-spindle yarn mill, using electric power.

Pennsylvania, Philadelphia. William Stringer is operating a small plant at the N. W. corner of Amber and Westmoreland streets, for the manufacture of cotton laps with one card and one willow, a gas engine being used to supply the power.

Pennsylvania, Philadelphia. J. H. Margerison, president of the late Margerison-Struth Mfg. Co., which was recently sold out at public sale, is about to equip a plant at Fox Chase with 16 looms for the manufacture of Turkish towels, damasks, Terry cloths, etc., the production of which will be sold direct. The machinery is now being shipped to this location and it is expected that the mill will be in operation within a few weeks.

*Rhode Island, Pawtucket. Foundations have been started for the new mill of the Solway Co. and the Ingrahamville Dye Works, previously reported.

*Rhode Island, Pawtucket. The plans for the new mill building which will be occupied by the Solway Mills, now at Westerly, and the Ingrahamville Dye Works, have been completed by Dwight Seabury, mill engineer, and the contract for building awarded, which calls for the completion of the plant by Dec. 1st.

Rhode Island, Warren. The stockholders of the Warren Mfg. Co. met a few days ago to act upon the recommendations of the officers to build another mill. It was decided to put up a fine yarn mill containing from 35,000 to 40,000 spindles, without looms, and the necessary steps will be taken to get the plant in operation as soon as possible.

*Rhode Island, Warren. Ground has been broken for the big new mill of the Warren Mfg. Co.

*South Carolina, Calhoun Falls. A project is under way to organize a new company to be known as the Calhoun Mills, to manufacture sheeting. It is proposed to have a plant with equipment of 25,000 spindles and about 800 looms, and to start operations about Oct. 1, 1907. This is the project in which Judge W. F. Cox of Anderson has been mentioned as interested.

*South Carolina, Greenville. Machinery is received daily and installed in the new plant for the Vardry Cotton Mills, which are expected to begin operations within two months. This mill is to be operated by water and steam power.

Enlargements and Improvements.

Alabama, Florence. The Cherry Cotton Mills, which are closed for repairs, will probably start up again about the 1st of October. A new power plant is being put in.

*Canada, Montreal. The new building to be erected by the Dominion Textile Co., Ltd., will be used as a cotton storehouse. It is estimated that it will cost about $75,000.

Connecticut, Fitchville. The Palmer Bros. Company have completed a two story addition to their mill at this place and are installing a 500 h. p. engine.

Connecticut, Moosup. Floyd Cranska, the thread manufacturer, is building an addition to plant which will very largely increase its capacity. The mill has been running day and night for some years, but with the enlargement it is expected that night work will be given up.

Georgia, Athens. The Southern Manufacturing Co. is to increase the capacity of the yarn department and will install new carding and spinning machinery (ordered).

*Georgia, Carrolton. In reference to report that the Mandeville Cotton Mills would enlarge plant, we learn that the directors of the mills were empowered to build another mill if they thought best to do so. No final decision has been reached, though it is likely that no mill will be built or begun this year.

*Georgia, Columbus. The Eagle & Phoenix Mills reported to instal 16,000 new spindles, will replace some of the old machinery with the new, but will have an additional number of about 3,500 over present equipment.

Georgia, West Point. It is reported that the West Point Mfg. Co. contemplates doubling capacity of the plant and to change from water power to electricity.

Kentucky, Louisville. The Louisville Cotton Mill Company is to build an addition to the dye house.

Maryland, Baltimore. The W. & J. Knox Net & Twine Co. will build an addition, 80 by 200, 3 stories high, to be equipped with special machinery for the manufacture of netting.

Massachusetts, Fisherville. The Fisher Mfg. Co., which has just completed a new weave shed, is now erecting a new cloth room, 96 by 65, two stories high.

Massachusetts, Great Barrington. At a special meeting of the stockholders of the Riverdale Mills, it was voted to increase the capital stock from $100,000 to $200,000 by issuing 6 per cent. preferred stock. The stockholders have the first chance to subscribe. It is reported and expected at Great Barrington that the proceeds will be used to complete an addition and make other improvements to the plant.

Massachusetts, Holyoke. The Hadley Mills of the American Thread Co. are to be rearranged so as to permit the installation of a large amount of new machinery. It was at one time thought that an addition might be built to the Kerr Mills at Fall River, but this plan has been given up.

*Massachusetts, Housatonic. Work is under way on the addition to the Monument Mills. This new building will provide additional space for the various departments and 10,000 additional spindles. A new picker house is also being built.

Massachusetts, Lowell. The Lowell Weaving Co. is to erect a new building, 300 by 70 feet, two stories, on Marginal Street and when completed will abandon the old plant.

*Massachusetts, Lowell. The new plant of the Lowell Weaving Co. is expected to be ready the latter part of November or the first of December. Building has already begun. They will use electric power. The mill has outgrown its present leased quarters and the new premises will give them 50,000 square feet instead of 20,000, as at present. More machinery will be added early next year. P. T. Jackson, Jr., is treasurer, and also attends to the buying.

Massachusetts, New Bedford. An addition is to be built to the Kilburn Mill and the capacity of the plant increased to 70,000 spindles.

*Massachusetts, Rockland. The Rockland Webbing Company is negotiating for land upon which to erect an office building. The space now occupied by that department is to be utilized for manufacturing purposes. Four new looms have been installed recently, making a total of 36 now in operation.

Massachusetts, Three Rivers. The Otis Company is to erect a new building, 60 feet long, brick, and two stories high, on site where some old sheds have been, adjoining their dyehouse. The new addition will be used for furnishing more room in the dye department.

Massachusetts,, Walpole. Various improvements have been made at the Lewis Batting Company's plant; small old buildings have been torn down, while two larger ones have been removed to better positions and fitted for active use.

Massachusetts, Webster. S. Slater & Sons, Inc., will build a bleaching and dyeing plant, 234 by 194, three stories high.

*Mississippi, Tupelo. The Tupelo Cotton Mills, which have purchased the building formerly occupied by the Topsey Hosiery Mills, propose starting new addition about Sept. 30th. They will have a total equipment of 8,000 spindles and 300 looms when additional equipment has been placed.

New York, Brooklyn. Wm. Salmon, braid manufacturer, whose factory is on Lorimer Street, is fitting up a new dye house and will be ready to begin work in about three weeks. J. H. Cardow is the dyer.

North Carolina, Concord. The Cabarrus Cotton Mill Company is to erect a large warehouse.

*North Carolina, Durham. The new addition to be built for the Golden Belt Manufacturing Co., upon which work has been begun, will be used as a bag factory. The new addition will be 130 by 60 feet, two stories.

*North Carolina, Graham. Work has been nearly completed on the addition to the Sidney Cotton Mills. They will soon install a new 250 h. p. engine and machinery in the spinning department.

North Carolina, Haw River. The Holt-Granite Cotton Manufacturing Co. has had an amendment made to the charter of the company, whereby the capital stock has been increased $250,000.

North Carolina, Roanoke Rapids. A new steam turbine power house is being erected for the Rosemary Manufacturing Company. Draper looms are being installed in the No. 2 weave.

Pennsylvania, Philadelphia. John H. Hughes of the John H. Hughes Co., dealers in cotton yarns of all descriptions at 2320 N. 8th St., has had prepared plans for a two-story and basement building at 4th and Erie Ave., with a frontage on Erie Ave., and for the erection of which he is now receiving bids. Mr. Hughes states that owing to the great increase of their business it is their intention, when the building is completed, to remove to that address. He also states that they will put in machinery for coning, spooling, winding, etc., which will enable them to fill orders as directed by their customers.

Pennsylvania, Philadelphia. Richard Thorpe, 1657 Meadow St., manufacturer of damasks and linen towels on 60 looms, has recently purchased from Thomas Mullholland the looms contained in his branch plant at 1545 Ruan St. It is said that Mr. Thorpe will start up the looms again operating the plant as a branch of the Meadow St. mill.

Pennsylvania, Philadelphia. Thomas Davenport, 2627 Mutter Street, manufacturer of rope portieres, curtains, loops and cords, reports that during the coming fall he will double the capacity of his plant and turn out a finer grade of goods. He sells direct, having recently opened up a salesroom in the northern part of the city.

Pennsylvania, Philadelphia. The Sterling Mills Co., 1824 Cadwallader St., manufacturers of narrow fabrics, novelties, etc., on 40 looms, report that they are increasing the equipment of their plant and have recently ordered new machinery for that purpose which is now coming in and being placed in readiness for operation. They are very busy.

Pennsylvania, Wilkesbarre. Plans have been prepared for a new building, 109 by 92 feet, four stories, to be built for the Wilkesbarre Lace Manufacturing Co. It is proposed to have the new addition completed and ready for occupancy by Oct. 1st and will be used for manufacturing yarn.

Rhode Island, Providence. A new engine is being installed in the Interlaken Mills plant at this place. It is expected to have same in running order by Sept. 1st.

*Rhode Island, Warren. The Warren Manufacturing Company has awarded contract for erection of the new mill, the main building of which will be 241 by 129 feet, three stories, with annex, 71 by 50 feet and engine house 41 by 37 feet.

*South Carolina, Fork Shoals. The Fork Shoals Cotton Mills propose making a small addition to their building and installing additional machinery, increasing spindle equipment to 5,248 spindles.

*South Carolina, Fork Shoals. At meeting held recently by the stockholders of the Fork Shoals Cotton Mills Company it was decided to increase the capital stock to $100,000. This additional capital is to be used for purchasing additional machinery and taking up the surplus of electric power recently acquired by the completion of a development near the plant.

*South Carolina, Spartanburg. Work is progressing on the addition to the Drayton Mills. It is expected to have the building ready for installation of the machinery by middle of September.

South Carolina, Union. The Monarch Cotton Mills have placed order for 3,000 additional spindles and a few more looms to be installed in the mill. It is expected to have the new machinery in operation by Sept. 15th, giving the company a total of 41,000 spindles and 1,000 looms.

South Carolina, Walhalla. The Walhalla Cotton Mill has increased its capital stock from $150,000 to $200,000 for additional capital for improvements.

*South Carolina, Williamston. Work is well under way on the new buildings for the Williamston Cotton Mills. The company will use electricity for driving the plant.

Tennessee, Shelbyville. The Sylvan Cotton Mills are installing considerable machinery in the plant, greatly increasing capacity.

Mills Starting Up.

Georgia, Eatonton. The repairs to the Middle Georgia Mill have been completed and the plant started again in full.

*Massachusetts, Taunton. The Taunton River Mills will start up early in September. P. H. Fenton from Willimantic is to be manager. They will manufacture cotton and silk dress goods, operating about 600 looms.

*North Carolina, Concord. The new mill of the Young-Hartsell Company has started up. The mill has 8,000 spindles and will run altogether on No. 24 soft yarn. The product is taken by the Cannon Mfg. Co.

Tennessee, Trenton. It is reported that the Trenton Cotton Mills have been sold to H. Smith, proprietor of the Athens, Ala., Hosiery Mills, and D. L. Lewis, president of the Sycamore Mills at Sycamore, Ala. After making some improvements and adding some machinery the mills will be started up on cotton yarn; formerly made sheetings.

WOOLEN.

New Mills.

*Connecticut, Central Village. Ever since last June there have been rumors to the effect that a large worsted mill would be established in this place, connecting the names of well-known manufacturers with the enterprise. Chas. E. Barber has recently bought the Rollins Mill property as a private investment, and it is presumed that if a woolen mill is built this property will be used, and it is understood that nearly $40,000 has been subscribed towards the erection of a 30-loom plant. The success of the plan depends upon the amount subscribed.

*Connecticut, Stafford. The new weave shed for the Rhode Island Worsted Co., will be 235 by 165, one story. The water power plant is being overhauled and two new turbines put in.

*Massachusetts, Franklin. The new mill for the Franklin Yarn Co. is nearly finished, and is expected to be ready to start about the 1st of October. A portion of the mill has been leased to the J. W. Linnehan Weaving Co., who will install 30 looms. The Linnehan company was burned out in the Fairmount Mill at Hyde Park.

*Massachusetts, Lowell. The United States Bunting Co. advises us that notwithstanding the reports that a new mill would be built, they have not positively decided the question as yet.

*Massachusetts, Lowell. The U. S. Bunting Co. has let the contract for their new mill, which will be 250 by 70, 5 stories high.

*Minnesota, New Ulm. The new stock company reported to establish a plant at this place, has not yet been organized, but will be shortly. They will erect a modern 2 set mill.

New Hampshire, Franklin. Benjamin F. Hayes of North Andover has leased a building which he will fit up as a weave shed, installing Crompton & Knowles looms, and will weave woolen and worsted goods on commission, beginning operations about September first.

*New Hampshire, Newport. Col. Seth M. Richards is president of the Brampton Woolen Company, recently reported incorporated, with capital stock of $50,000; Col. Sam D. Lewis, vice president and Vincent J. Brennan, Sr., general manager. Sackings and dress goods will be made. It is proposed to make this an 8-set mill, but at present will install 4 sets cards, four mules (360 spindles each) and 50 broad looms.

New York, Jamestown. It is reported that parties prominently identified with the manufacture of textiles are about to start up a plant on a large scale for the manufacture of dress goods and suitings. The parties having the matter in hand are now seeking a desirable location for the mill and also capital from parties who would like to join in such an enterprise.

Pennsylvania, Philadelphia. Messrs. Cooper, Lucas & Creamer, under the name of the Wellington Worsted Mills, are equipping the second floor of the Cope Mills, Wayne Junction, with 40 forty-two inch looms for the manufacture of men's wear and dress goods, the production to be sold through Meinhardt & Co., N. Y. E. S. Creamer, the superintendent, states that the plant will be in operation within a week or two. They will use cotton, woolen and worsted yarns.

*Pennsylvania, Philadelphia. The Landenberger Manufacturing Co., with $25,000 capital, C. H. Landenberger, president, and C. H. Landenberger, Jr., treasurer, which recently leased the old O'Neill Mill at Howard St. and Columbia Ave., which it is now putting in condition for the installation of its 50 looms for the manufacture of women's wear to be sold through New York, state that they cannot tell just how soon the plant will however, that they will be in operation within a be put in operation as they are waiting on the loom builders to ship them their looms. It is hoped, very short time.

*Pennsylvania, Philadelphia. The Monarch Rug Co., who are located at Unity and Leiper Sts., Frankford, are now almost ready for operation; the first shipment of looms will be received during the middle of August and will be put in operation at once. The plant will contain 15 looms and will turn out Axminster rugs with Joseph R. MacElroy as president and superintendent. The product will be sold direct.

*Rhode Island, Pascoag. Work on the new Hawthorne Worsted Co.'s mill is progressing rapidly. It is expected that the building will be ready for the machinery early in the winter.

*Rhode Island, Woonsocket. Work is progressing rapidly on the new mill for the French Worsted Company.

Enlargements and Improvements.

*Massachusetts, South Acton. The addition which the South Acton Woolen Co. is building will be 90 by 30, for the purpose of giving them additional needed space.

Massachusetts, South Royalston. The Geo. Whitney Woolen Co.'s mill is being operated night and day. Three sets of cards have recently been added, with sixteen spoolers and two new water wheels.

*Massachusetts, Spencer. The Allendale Woolen Company is replacing the narrow looms in the plant with broad ones. The Wicks Mill, recently secured by the above concern, is being put in operation.

Massachusetts, Worcester. Contract has been awarded for erection of a new mill, 88 by 48 feet, brick, two stories, for the Daniels' Worsted Mills.

*Missouri, Sedalia. The project of consolidating the Sedalia Woolen Mills and the California Woolen Mills is not likely to go through, but the Sedalia Mills are considering adding another set of cards and some looms. There have been some changes among the officers. Elmer Savage is treasurer, F. Hugelman, agent, and W. A. Trotter, superintendent. Mr. Hugelman does the buying.

*Ontario, Almonte. The additions to the Rosamond Woolen Co.'s mill will not be undertaken until next spring. Plans are being prepared.

New Hampshire, Ashuelot. A wooden building is to be erected for the Sheridan Woolen Mills, to be used as a packing and shipping room.

*New York, Albany. We have been advised by Frank B. Graves that the fire at his plant was confined to one building, 3 stories, brick, 40 by 80 feet, the three adjoining buildings being saved. Will rebuild. The loss was placed at $40,000, covered by insurance.

New York, Camden. The Camden Woolen Mills have been incorporated with capital stock of $12,000 and will continue the plant started by H. W. Lindley. The other parties interested are Henry W. Lindley, Joseph B. Lafavre (Camden) and Thomas J. Ward (Watertown).

Ontario, Almonte. The Rosamond Woolen Company contemplates enlarging the mill by erecting a new weave shed.

Pennsylvania, Millville. The Enterprise Worsted Mill is to install dynamos and an electric light plant for lighting the building. They are also endeavoring to secure contract for lighting the streets of this place.

Pennsylvania, Philadelphia. John Norris, Mascher and Turner streets, manufacturer of silk and woolen dress goods on 40 narrow looms, reports that he is very busy on cotton worsteds and all silk dress goods. He has in contemplation the taking over of a mill outside of the city which will almost double his present plant. Mr. Norris is also the superintendent of the Burlington Silk Weaving Co.'s mill at Burlington, N. J., of which McDonnell, Stout & Co., of this city, are the proprietors.

Pennsylvania, Philadelphia. The Collinwood Mills, Third and Somerset Sts., owned and operated by Folwell Bros. & Co., manufacturers of woolen and worsted goods for men and women's wear, are increasing the capacity of their spinning department and have recently placed an order with Messrs. Stoddard, Haserick, Richards & Co., for 10 spinning frames and 4 twisters.

Pennsylvania, Philadelphia. The Shetland Worsted Mills, located at Ashmead and Wakefield Streets, Germantown, have taken over the mill formerly occupied by the late Manningham Worsted Co. at Stenton Avenue and Haines Street, in which it is said they will install 25 looms. Their intention is to remove their entire plant to this mill when their lease expires at the former address. Messrs. Riggs, Worthington & Simons are the proprietors and they manufacture men's wear and worsted and cotton dress goods on 20 looms, selling through New York. They are very busy.

Pennsylvania, Philadelphia. The Westmoreland Mfg. Company, of which Thomas Whitehead is the proprietor, and which has been in operation for about eight months at American and Somerset Streets, has met with great success. He has leased two floors at 2627 Mutter Street, into which he will remove within a short time. He manufactures a line of rain cloths for which he has received so many orders that it has been necessary for him to rent larger quarters to enable him to increase his plant, which will be doubled. Product is sold direct.

Pennsylvania, Philadelphia. Thomas Mullholland, manufacturer of cotton and woolen goods at Adams Avenue and Church Street, Frankford, has purchased from Robert Megowan & Son 40 narrow looms which they have not had in operation for some time. Mr. Mullholland will start them up on dress goods and men's wear. His equipment now consists of 90 looms, all of which will be in operation within a few days. Product is sold direct.

Pennsylvania, Philadelphia. Robert H. Shaen, operating 30 broad looms on worsted and cotton goods, men's wear, at 2636 Mascher St., has leased the south end of the fourth floor in the Hoyle, Harrison & Kaye Mills, Indiana Ave. and A St., into which he will remove within a short time.

Pennsylvania, Philadelphia. The Fern Rock Woolen Mills, Trenton Avenue and Wishart Street, who have recently made many additions to their buildings, are about to make alterations to their boiler house, the plans for which have been made by Messrs. Ballinger & Perot, who are now asking for bids on same.

Rhode Island, Pascoag. An addition, 50 by 47 feet, two stories, and basement, is to be built to the Anchor Mills. The basement is to be used as an extension to the machine shop, while the upper floors will be occupied by the sewing and burling rooms.

*Rhode Island, Washington. The Elite Spinning Co. say that their additions will consist in two sets of cards for spinning. They make yarn for the woolen and knitting trade, and will make a specialty of custom work.

Mills Starting Up.

Maine, South Berwick. The Newichawanick Woolen Company has resumed operations after a two weeks' shut down.

*Maine, Waterville. The Riverview Worsted Mill will soon be running to its full capacity under the new management.

Massachusetts, Clinton. The Bigelow Carpet Co. has started up after two weeks' shut down, during which time new boilers were installed.

*Massachusetts, Franklin. Operations are expected to be started October 1st in the Franklin Yarn Company's new mill.

*Massachusetts, Middleboro. The Nemasket Worsted Co., the new concern which took over the Farwell Mills, has started up. C. W. Barnes is the manager, Geo. B. Sanford, New York, treasurer; F. W. Reed, secretary. Same line of goods to be made as before.

*Pennsylvania, Philadelphia. S. W. Goldsmith, recently reported by us as about to start up 30 looms in the manufacture of woolen and worsted goods at Oxford and Josephine Streets, Frankford, reports that the plant is now in full operation. The plant is run under the name of the Devonshire Woolen Mills, the goods being sold from Mr. Goldsmith's office at 925 Chestnut Street.

*Rhode Island, Washington. The Narragansett Worsted Company will start operations in about two weeks in the old Washington Mill, being remodeled. This concern, which is incorporated, will operate 20 looms, making men's wear. Adolf G. Kurze is president of the company, Otto A. Kurze, treasurer, and Austin T. Levy, agent. Goods will be sold direct.

*South Carolina, Greenville. Operations will start in about ten days by the McGee Manufacturing Co. making blankets, exclusively. The company has added a dyeing department to the mill.

For Knitting Mill News, see Knitting Department.

SILK.

New Mills.

New Jersey, Paterson. The Hamilton Silk Throwing Company has been incorporated with capital stock of $50,000 for manufacturing silks, etc. Among those interested are I. D. Ashley, T. O'Hara, Paterson, and A. H. Dellicker, Hackettstown.

New Jersey, Paterson. Wm. H. Rogers, who has been superintendent of the Harmony Silk Co.,

has sold his interest to Mr. Baer, the treasurer, and will start a plant of his own with about 4,000 spindles, for commission throwing. He has leased quarters in the Nathan Barnert mill on Railroad Ave.

*New York, New Berlin. E. E. Elwood of Shamokin, who has been reported as about to establish a silk mill at this place, advises us that no definite conclusion has yet been reached, but the plant is still under consideration.

New York, Sidney. The Sidney Silk Co., has been incorporated with capital stock of $35,000 to manufacture silk dress goods. J. S. T. Murphy, T. S. Napier and J. J. Phelan are mentioned as interested.

*Pennsylvania, Easton. The Haytock Silk Throwing Co. incorporated recently with capital stock of $50,000, will start operations in about 10 weeks, throwing in all its branches. Wm. R. Haytock is president of the company, C. Cronemeyer, treasurer and Dr. Benj. Haytock, Jr., superintendent. Plant will have equipment of 12,500 spindles. The above company is practically a part of the Easton Silk Co., under a different manager.

Virginia, Danville. The Danville Knitting Mills has recently increased the capital stock and will utilize a new building recently secured, for manufacturing purposes. The new addition is three stories and will be equipped with modern machinery.

MISCELLANEOUS.

*Connecticut, Meriden. The Meriden Braid Co. has leased plant on Veteran St. which they will remodel and soon begin the manufacture of all kinds of silk, woolen and cotton braid, starting with 75 machines, and increasing the number later.

Connecticut, South Norwalk. J. & J. Cash are building a factory on Chestnut St. for the manufacture of narrow fabrics. This is a branch of an establishment in England. The building is nearly completed and they are now looking up the question of machinery and supplies.

Pennsylvania, Philadelphia. The Colonial Dye Works, which A. R. Cullen has been operating at Mascher St. and Columbia Ave., has been dismantled and is no longer in existence, Mr. Cullen having accepted a position with a large concern outside of the city.

Pennsylvania, Philadelphia. The Angola Dyeing Co., dyers of fast black on hosiery, whose main works are at Hancock and Huntingdon Streets, are equipping the old Buckhalter dye works on Clearfield Street, above Front, with machinery for the dyeing of colors on hosiery and also for bleaching purposes. This plant, which will be operated as a branch of the main dyehouse, is now in part operation.

Pennsylvania, Philadelphia. The Wayne Dyeing and Finishing Co. is the name of a new concern recently started up at Wayne Junction. The company dyes and finishes hosiery and claims to have so many orders on hand that they are not looking for any further business.

Pennsylvania, Philadelphia. J. Bromley, owner of the tenement mill at Adams and Leiper Streets, Frankford, in which are located several textile manufacturers, has had prepared by Stearns & Castor plans for a three-story addition 79.3 by 203 feet.

Pennsylvania, Philadelphia. The Summerdale Dyeing, Printing & Finishing Works at Holmesburg, dyers and printers of cotton piece goods, have had plans prepared for extensive alterations and a two and a half-story stone addition to the present plant, which will measure 40 by 60 feet. The architect is Louis C. Hickman.

Texas, Dallas. The Dallas Waste Mills have been organized, with R. M. Williams, secretary and treasurer, and C. H. Thomas, general manager. A plant with daily output of 15,000 pounds cotton waste will soon be put in operation.

FACTS AND GOSSIP.

*Alabama, Huntsville. The Merrimack Mfg. Co. advises us that they do not even contemplate building a large finishing plant at this place.

*Alabama, Selma. We have been advised that nothing definite has yet been done regarding the efforts to locate a cotton belt manufacturing company here.

*Alberta, Lethbridge. The City Council is submitting a by-law to the rate payers to guarantee debentures of the woolen mill company, previously reported proposed, to the extent of $40,000. Voting on this by-law takes place latter part of the month and it is thought will probably be carried through.

Arkansas, Vanburen. E. B. Miller is promoting a cotton mill to be located at this point, which is just across the Arkansas River from Fort Smith. Effort is being made to establish a mill with $300,000 capital. Over $50,000 has been subscribed, a good part of this being taken by a practical mill superintendent who expects to take the management of the mill when completed. They are interested in hearing from builders of machinery who are willing to put in machinery and equipment for part cash payment, and the balance in bonds.

Canada, Winnipeg. It is reported that a company has been formed in Milwaukee, Wis., for purpose of operating a knit goods plant at this place.

Colorado, Denver. It is reported that Joseph Harriman of Lowell, Mass., manufacturer of elastic and non-elastic goods, is considering starting some such plant in the building formerly occupied by the Overland Cotton Mills. The Murphy Mfg. Co., of Cohoes, is also reported as looking over the property.

Connecticut, Bridgeport. Lewis Neuberger, secretary and treasurer of the Connecticut Web Co., has sold his interests in that concern to Lewis Rothschild, president, and retires from the concern. L. S. Moses, Mr. Rothschild's nephew, succeeds him.

Connecticut, Danielson. The Danielson Worsted Company is operating the mill night and day

to keep up with orders. It is stated that an enlargement may be made to the mill shortly.

Connecticut, Danielson. The Industrial & Manufacturing Co., of which L. J. Coburn is general manager, have bought 100 acres of land and will proceed to develop it, the first step being to erect a large factory building.

Connecticut, East Willington. A new concern, called the Willington Woolen Co., is reported to have bought the stock and leased the premises occupied by the Connecticut Woolen Mills, formerly the Daleville Mills This is a 2-set plant with 16 looms. The president of the new concern is Simon Sionsky of Philadelphia.

*Connecticut, Glastonbury. The Angus Park Manufacturing Company has been incorporated with capital stock of $50,000, to operate the Crosby Manufacturing Co.'s plant, recently purchased.

*Connecticut, Turnerville. The mill of P. W. Turner & Co., which was burned last December, may be rebuilt. The foundation is being put in, but they will probably do little more this year.

Georgia, Eatonton. The Middle Georgia Mills have been damaged recently by a freight train collision. As the main shafting was deranged it will take some time to make repairs.

Illinois, Chicago. The Detmer Woolen Company has been reported incorporated with capital stock of $50,000.

Illinois, Fairfield. The Fairfield Woolen Mills, which have been closed for a number of years, are reported to be put in operation by Sexton Bros., of St. Louis, Mo., manufacturers of underwear and overalls.

*Kansas, Oakland. The Oakland Woolen Mills, which have been put in operation under a new management, are filling orders. A new set of carding and spinning machinery has been added to the two sets already in the mill.

*Maine, Skowhegan. The Maine Spinning Company, recently reported having secured additional space, is equipped with 3,400 worsted spindles (Bradford system), for making worsted yarns, 10s to 40s. Chas. E. Young is president of the company, N. B. K. Brooks, treasurer and Wm. Mitchell, superintendent.

Maryland, Baltimore. Frank M. Widner, president of the Realty Corporation, is reported corresponding with Philadelphia parties who desire to locate a warehouse at this place.

*Massachusetts, Clinton. The sale of the Nashua Valley Mills has been confirmed, and the new company will take possession in September. The manager will be Victor P. Thewlis, now manager of Holden, Leonard & Company's New Bedford mill. E. B. Moore & Co. of New York will sell the goods. The present owners retire from all connection with the business.

Massachusetts, Fitchburg. The American Woolen Company has changed the name of the plant at South Fitchburg to the Cambridge Mill.

Massachusetts, Gardner. The mill that is being built for the Oxford Fibre Co., E. C. Mudge, treasurer, is about completed, but the machinery is not yet ready, and will probably not be installed until the latter port of September. This concern has a special process of working up waste and tow fibre.

*Massachusetts, Millbury. The John P. Crane Co., previously reported having disposed of property at this place, is not to continue in business. Mr. John P. Crane has accepted a very lucrative position with the Indian Orchard Co. and this may have given rise to rumor that the plant was to be restarted at the latter place.

Missouri, Sedalia. It is reported that a project is under way for consolidating the Sedalia Woolen Mills and the California Woolen Mills at California, as the stockholders of the Sedalia plant practically own the California Mills. If carried through, a greater part of the machinery will be removed to the Sedalia mill and the plant at California equipped for finishing owing to available water.

New Jersey, Camden. The Camden Dye Works, 613 Pearl Street, dyers of woolen and worsted skein yarns and slubbing, of which Joseph Hussong is the proprietor, is very busy. Mr. Hussong, who is also the proprietor of the American Dyeing Machine Co., builders of a skein dyeing machine of unusual excellence, at the same address, states that this company has quite a number of orders on its books for this machine and has also placed several of them in some of the largest dye houses in Philadelphia and vicinity within the past few months.

New York, New York. The amalgamation of the commission house of J. Harper Poor & Company with Amory Browne & Company is announced. The former firm is dissolved and Mr. Poor becomes a member of the firm of Amory Browne & Company. This is understood to mean the community of interest of the Park Hill Manufacturing Company of Fitchburg and the Lancaster Mills at Clinton, Mass. Mr. Arthur H. Lowe, the treasurer and manager of the Park Hill Company, becomes president and general manager of the Lancaster Mills, and Mr. Richardson, the present agent, retires. J. Harper Poor & Company have been sales agents for the Park Hill Company and Amory, Browne & Company will now act as selling agents for both mills, which occupy leading positions as gingham manufacturers. The Lancaster Mills operate about 3,300 looms and the Park Hill 2,700. The other accounts handled by J. Harper Poor & Company, which will be transferred, are the Wauregan Company of Wauregan, Conn., and the Lowe Manufacturing Company of Huntsville, Ala.

*North Carolina, Mt. Airy. J. L. Brown of Taylorsville, N. C., who has bought the Laurel Bluff Cotton Mills, will take charge of same Nov. 1st. The mill is now making No. 14, 2-ply yarns. He has not decided whether he will make any improvements to the plant immediately or not.

Pennsylvania, Philadelphia. In one of the textile directories (not that compiled by Textile World Record), just published, under new mills is the Alberta Knitting Mills, Sigmund M. Witz, proprietor, 235 Wister Street, successor to David Jarvis. Mr. Jarvis states that this is incorrect, that he was and is still the proprietor of the knitting plant at that address, where he is operating 42 knitting machines on cotton and woolen hosiery and fancy knit goods, which he sells direct and reports a good business. The Alberta Knitting

Mills is a name used by Mr. Witz, who is a selling agent, in selling his goods to the trade and is no longer in existence.

Pennsylvania, Philadelphia. The Industrial Worsted Co., Inc., has applied for a charter, the officers being A. Patchett, president; M. Patchett, vice-president and W. Patchett, treasurer and superintendent. This new company will operate the old Dewhirst and Broadbent plant located on Main St., Manayunk, which was recently purchased by Mr. A. Patchett at an executor's sale, on single and two-fold worsted yarns up to 2/32s, with 2,000 spindles and 2 sets of drawing. The company has a capital of $10,000 and is now running on commission spinning.

Pennsylvania, Philadelphia. The National Cotton Tuft & Fibre Co., a company which has been in operation for almost a year at 22d and Wood Sts., manufacturing cotton tufts and mattress fibres, reports an active business at this time. They have recently added five new tufting machines and will put in several more of the same pattern after September 1st. It was also the intention of the company, when first started up, to add a dye house. They state that they have now given this idea up due to the fact that they have not sufficient room in their present quarters and also that they can obtain better service by having this work done outside. The company has a capital of $25,000 and Barker L. Brown, president, and Edward B. Mallison, treasurer, supt. and buyer.

Virginia, Norfolk. The Norfolk Yarn Mills, controlled by Barton Myers, have been sold to E. P. Mueller of Milwaukee. This mill contains about 2,700 spindles.

Personals.

William H. Hodgson of the Globe Mills of Utica, N. Y., has accepted the position as superintendent and designer for the Sheriff Worsted Co., Fitchburg, Mass.

E. P. Merrill has accepted the position as overseer of finishing for the C. B. Alling Co. at Derby, Conn. He was formerly at Lakeport, N. H.

Fred K. Stevens of Rochester, N. H., has accepted a position as overseer of spinning with the Marland Mills, Andover, Mass. Mr. Stevens was for a number of years with Falkner & Colony Co., Keene, N. H.

John W. Whitehead, who held a position as second hand in the weave room at the Assabet Mills, Maynard, Mass., on resigning his position to accept one at the Bay State Mills, Lowell, Mass., was presented with a handsome gold watch, chain and charm by his fellow workers at the Assabet Mill.

Thomas Whipple, overseer of spinning for the Atlantic Mill, Lawrence, Mass., has resigned to accept a position at New Bedford, Mass.

Henri Giette, overseer of finishing for the Whittington Mfg. Co., Taunton, Mass., has resigned and is succeeded by Edwin H. Holmes.

Alexander MacMurray has taken the position as overseer of ring spinning for the Dwight Mfg. Co., Chicopee, Mass., Albert McDonald having resigned.

I. S. Brooks has resigned as overseer of finishing for the Indian Spring Woolen Co. to take charge of finishing at the Camden Woolen Co., Camden, Me.

J. W. Robbins has accepted a position as overseer of weaving with the Atlantic Mills, Lawrence, Mass. He was formerly at the Chicopee Mfg. Co.

J. E. Allen of Cohoes, N. Y., has taken charge of ring spinning for the American Thread Co., Holyoke, Mass.

David A. Lapraik, assistant dyer at the Franklin Mills, Franklin Falls, N. H., while carrying a tub of boiling hot dye lost his balance, fell and plunged both hands into the dye. His hands and arms were frightfully burned and dyed a deep red to the elbows. Physicians dressed the injuries and David returned to the mill and took charge of some work that had to be finished up.

V. J. Brennan, superintendent of A. G. Dewey Co. Woolen Mills for the past eleven years, has tendered his resignation to take effect Oct. 1st. Mr. Brennan will associate himself with the Brampton Woolen Co. at Newport, N. H., a new corporation recently organized for the purpose of manufacturing sackings and dress goods. It is intended to make this an eight set mill. At present four sets of cards, four mules with three hundred and sixty spindles each and fifty broad looms will be placed in the mill.

H. V. Deaner has resigned as overseer of spinning at the Wilmington Cotton Mills, Wilmington, S. C., to take a similar position with the Maple Mills of Dillon, S. C.

L. S. Neal, formerly of Spray, N. C., is now superintendent of the Hopedale Mill at Burlington, N. C., succeeding C. E. Beale.

Peter Kelly, superintendent of the Vermont Mill at Bessemer City, N. C., has resigned to take a position as overseer of carding and spinning for the Dilling Mill, King's Mountain, N. C.

James Metcalf, formerly of Lawrence, Mass., but recently with the Tingue Plush Co. of Seymour, Conn., has resigned to take a position with the Wood Worsted Mills.

Sidney H. Little, for the past seven years designer for Sayles & Jenks of Warren, Mass., has resigned and expects to be located in Stafford Springs, Conn.

William Bennett, overseer of carding at River Point, R. I., has resigned to accept a position as superintendent of carding, spinning and weaving for the Pittsfield Mill, Pittsfield, N. H. Chas. Young of the Royal Mill succeeds Mr. Bennett.

William Whitehead has accepted a position as overseer of weaving for the Bay State Mills, Lowell, Mass.

Joseph Binns has resigned his position at the

Tingue Mfg. Co., Seymour, Conn., to go to Oriental Textile Mills, Houston, Texas. J. Metcalf has taken a position as overseer of spinning at the Oriental Textile Mill.

William H. Bowker, overseer of the worsted cloth room of the Manchester Mills, Manchester, N. H., has tendered his resignation, in order that he may take a needed rest. He will be succeeded by S. R. Nelson, now in charge of the print cloth room.

H. H. Boyd, now in charge of the Chadwick and Hoskins mills, will also assume supervision of the Louise mills, succeeding J. M. Williams, resigned.

Charles Weeks, overseer of carding, has severed his connection with the Northboro Woolen Mills, of Chapinsville, Mass.

Fred J. Sutcliffe, overseer of dyeing for the Maine Woolen Co., of Oldtown, Me., has severed his connection with that mill and has been succeeded by Chas. F. Firth, formerly overseer of dyeing at the Mount Battie Woolen Mills, of Camden, Maine.

M. H. Gaynor, formerly overseer of carding with the Tremont & Suffolk Mills, has taken a similar position with the Nockege Mills, of Fitchburg, Mass.

J. M. Williams, superintendent of the Louise Mills, of Charlotte, N. C., has resigned his position to take one as general manager of the Cora and Dilling cotton mills, of King's Mountain, N. C., where he was formerly superintendent.

J. D. Bacon, for several years superintendent of the Efird Mfg. Co., of Albemarle, N. C., has taken the position as superintendent of the Wampum Cotton Mills, at Lincolnton, N. C.

George Wright, superintendent of the Shove Mills, and formerly at the Davol Mills, in Fall River, Mass., has resigned his position and will be succeeded by Charles H. Richardson, Jr., formerly with the Globe Yarn Mills.

J. P. Carter, overseer of weaving for the Arcadia Mills, Spartansburg, S. C., has resigned to accept a position as overseer of weaving and slashing at the Inman Mills, Inman, S. C.

L. L. Clifford, formerly overseer of spinning for the Whitney Mfg. Co., of Whitney, S. C., has taken the position as superintendent of the Cherokee Falls Mfg. Co., Cherokee Falls, S. C.

Max H. Wagner, who has been assistant superintendent at the Waverly Woolen Mills, of Pittsfield, Me., has accepted a position with the American Woolen Co., in New York.

J. D. Thompson has resigned as overseer of spinning for the Millen Mills, Millen, Ga., to accept a similar position with the Aiken Mfg. Co., of Bath, S. C.

P. E. Riley, who has been overseer of finishing for the C. A. Root Co., of Uxbridge, Mass., has accepted a similar position with the Bay State Worsted Co., of Worcester, Mass.

Walter Dennison, overseer of finishing, has severed his connection with the Brookville Woolen Mills, of Brookville, Pa. He is succeeded by William Taylor, of North Billerica, Mass.

Benjamin Metcalf, employed at the Farwell Bleachery for a number of years, has accepted a position as assistant dyer at the Washington Mill, Lawrence, Mass.

Jessie Towers, overseer of weaving at the Atlantic Mill, Lawrence, Mass., has resigned. William Hill, overseer of dressing at the Pemberton Mill, has also resigned.

John Henrick, overseer of spinning at the Cranby Mills, Columbus, S. C., has been transferred to the Olympia Mills in the same city. He has been succeeded as overseer of spinning at the Cranby Mills by B. R. Riddle, who was formerly overseer of spinning at the Richland Mills.

Chas. H. Arnold, who has been superintendent for the B. B. & R. Knight Co., Pontiac, R. I., is to resign his position as superintendent of the bleachery and it is reported that he is to return to North Grosvenordale Co., North Grosvenordale, Mass.

James E. Cunneen, superintendent of the Seaconnet Mills of Fall River has retired permanently from active work after a number of years of continuous useful service. Some years ago he started as a foreman and by his energy he soon reached the top of the ladder. He was at the Border City Mills in 1872, when Mr. Cunneen started as superintendent. He remained there until 1879, when part of this mill burned but was soon rebuilt. In 1881 he had a hand in the organizing of the Laurel Lake Mills and was made agent and superintendent, but a change in the controlling interest three years later induced Mr. Cunneen to start the Seaconnet corporation, of which he has been a working head until up to the present. His son, Fred Cunneen, was overseer of weaving but has now taken his father's position temporarily.

P. H. O'Keefe, formerly superintendent for the James J. Regan Mfg. Company, Rockville, Conn., has been appointed assistant to F. C. Morse, Mgr., of the Mascoma & Riverside Mills of the American Woolen Company, Lebanon, N. H..

Geo. Oakey has accepted a position as foreman of the picker room of the Ann & Hope Mills, Lonsdale Company, Lonsdale, R. I., John Beroke, having resigned.

Thos. Ryder, of Crompton, R. I., has accepted the position as head dyer for the Corduroy department of the New York Mills, N. Y., succeeding Thos. Gorring.

Arthur E. Fawthrope, overseer of the finishing department for the Lancaster Mills, Clinton, Mass., has concluded his services for this company. Mr. Snow, formerly boss finisher, for the Parkhill Mill, Fitchburg, succeeds Mr. Fawthrope.

Israel Bell has resigned his position as overseer of carding at the Hebron Cotton Mills, Hebronville, Mass.

James Blackwood, overseer for the National and Providence Mill, Providence, R. I., has accepted a position with the Earnscliffe Mill, having been employed by the former company the past 15 years. The overseers presented him with a smoking set. The employers of the yarn department gave a costly leather covered chair.

Samuel Burton, overseer of spinning in the No. 3 Mill, at Manchaug, Mass., has resigned.

Wm. Edgerly, formerly carder at the Chicopee Mfg. Co., Chicopee Falls, Mass., is now at the Naumkeag Steam Cotton Co., Salem, Mass.

Clark Faulkner, who had charge of carding at the Geo. Whitney Woolen Company, South Royalston, Mass., is now at the Burlington Mills, Winooski, Vt.

John Hefferman has resigned his position as designer for the Rhode Island Worsted Co., Indian Orchard, Mass., and has been succeeded by Sydney H. Little, formerly designer at Sayles & Jenks, Warren, Mass. Mr. Hefferman has accepted a position at Lymansville, R. I.

Wm. Hyde, for many years overseer for John Kenyon Mfg. Co., Pawtucket, R. I., has been appointed superintendent of that concern, succeeding James Kenyon, who finished his duties as superintendent. Mr. Kenyon expects to sail for England the latter part of August.

Albert Leger, formerly with the Hamilton Woolen Company, Amesbury, Mass., is now at the Peabody Mfg. Co., Newburyport, Mass.

James Long, formerly of Hinsdale, Mass., is now in charge of carding for the Davis & Mahoney Mills at Pittsfield, Mass.

J. M. O'Brien, formerly at the Asheville Cotton Company, is now superintendent at the Riverdale Mills, Great Barrington, Mass.

John L. Roach, who has been employed at the Raritan Woolen Mills, Raritan, N. J., has accepted a position as overseer of spinning for the Wilton Woolen Company, Wilton, Me.

John Robbins, formerly in charge of the weaving at the No. 1 Mill of the Chicopee Mfg. Co., Chicopee Falls, Mass., is now at the Atlantic Cotton Co., Lawrence, Mass.

Thomas H. Spurr, West Buxton, Me., has accepted a position as overseer of dyeing at the Riverside Woolen Company, Stafford, Conn.

Sydney G. Brown, formerly second hand in the spinning room for the Assawaga Company, Dayville, Conn., has accepted a position as overseer of spinning at the Cheshire Mills, Harrisville, N. H.

A. L. Tainter has resigned his position as overseer of finishing for the Beaver Brook Mills, Collingsville, Mass.

John E. White, who was overseer of spinning at the Pondicherry Mill, Bridgeton, Me., has resigned after eighteen years of continuous service. He is succeeded by S. Widdows, who was overseer of the No. 2 Mill.

George Parent, has accepted the position with the Plainfield Woolen Company, Central Village, Conn., as overseer of spinning, Adolph Zeigler having resigned.

Thos. Horrocks, formerly overseer of weaving for the Hebron Manufacturing Company, Dodgeville, Mass., but more recently with the Butler Mills, New Bedford, Mass., has accepted the position as overseer of weaving for the Dwight Mfg. Company, Chicopee, Mass.

James J. Shey, formerly finisher at the Raritan Woolen Mills, Raritan, N. J., has accepted a position as overseer of finishing for the Meriden Woolen Company, Meriden, Conn. Mr. Hatfield, formerly of Raritan, N. J., has accepted a position as overseer of carding for the same company.

Charles G. Tait, who held the position as designer for the Waverly Mills, Pittsfield, Maine, for a number of years, has accepted the position as designer with the Riverside Mills, of the American Woolen Company, Providence, R. I.

Charles Elder, formerly overseer of carding at Spencer has taken charge of carding at the Dawson Mfg. Company, Holden, Mass.

John Willis, employed in several mills in Philadelphia, has accepted a position as overseer of weaving for Edward Steele & Co., Bristol, Pa.

George Ingraham, for many years machinist for the Hinsdale Woolen Company, Hinsdale, Mass.. has accepted the position with the Stanley Electric Company, Pittsfield, Mass.

Chas. E. Thomas, a resident of Woonsocket, R. I., who was agent for the Forestdale Mfg. Company, has accepted the position as manager of the Robert Knight's Cotton Mill and Bleachery at Pontiac, R. I.

Charles Weeks, formerly overseer of carding for the Northboro Woolen Mills, Chapinsville, Mass., has accepted a position as overseer of carding for Faulkner Mills, Stafford Springs, Conn.

Chas. F. Heap, overseer of carding at the Blackstone Mfg. Co., Blackstone, Mass., has accepted a like position in the Hatheway Mills, New Bedford, Mass. He is succeeded by Bills, of Pontiac, R. I.

Geo. Greendonner has resigned his position with the National and Providence Mills, Providence, R. I., and accepted a position as assistant designer with the Laurel Mfg. Company, Somerville, N. J.

Frank Bills, overseer of carding at Pontiac, R. I., has been engaged as overseer of carding for the Blackstone Cotton Mills, Blackstone, Mass.

James Fraser, formerly boss dyer at Gilbertville, Mass., has accepted a position as overseer of dyeing with the Terry Mfg. Company, Waterville, Me.

Thos. C. Scott, formerly overseer of carding at the Kennebec Mills, Fairfield, Me., has accepted a similar position with the Concord Mfg. Company, Penacook, N. H.

Herman Bosback has accepted the position as overseer of finishing for the Germania Mills, Holyoke, Mass. Mr. Bosback held this position some years ago.

Trederick Throp, who was overseer of finishing at the Bellevue Woolen Mills, has accepted a similar position with the Allen Woolen Mills, Rochester, N. Y.

Edward Saunders has accepted the position at the Hudson Blanket Mills, Hudson, Mass., as overseer of carding and spinning. John Ready has accepted the position as overseer of finishing for this company.

Jos. Kroiger, formerly boss carder at West Buxton, Me., has accepted a similar position with the Riverside Mills Stafford, Conn.

Frederick Pohlmann, formerly boss dyer for the Hinsdale Woolen Company, Hinsdale, Mass., has left for his home in Germany with his family. Mr. Pohlmann held a position as overseer of dyeing with the Hinsdale Woolen Company for a number of years.

Arthur S. Brackett, who was employed for a number of years as superintendent for the B. B. & R. Knight Company, at Riverpoint, R. I., has resigned his position. He intends to give up active business for the present and go to Florida. He was originally a Maine man, resigned a position at the Osborn Mills, Fall River, 21 years ago. He succeeded John Hamlet at Riverpoint and was soon made superintendent of the Royal and Valley Queen Mills also.

J. H. Swing, formerly of Charlotte, N. C., has accepted a position as overseer of carding in the Dillon Cotton Mills, Dillon, S. C.

D. E. C. Clough, overseer of spinning and winding nights at the Maple Mill, Dillon, S. C., has resigned and accepted a position as overseer of spinning and spooling for the Orangeburg Mfg. Company, Orangeburg, S. C.

E. J. Grover, overseer of weaving with the Dallas Mfg. Company, has resigned to accept the superintendency of the the Cawthon Mills, Selma, Alabama.

A. B. Saunders, formerly superintendent of the Statesville Cotton Mills, after several months' stay at McComb, Miss., has returned to Statesville, N. C., where he expects to erect another mill in the near future.

David B. Hart, who has been employed as general second-hand in the finishing room at the Sawyer Mills, Dover, N. H., has accepted the position as overseer of finishing at the Rochester Woolen Co., Rochester, N. H.

W. C. Spencer, who has been for some time at Edenton, N. C., is now with the Rhode Island Mills at Spray, N. C.

Albert D. Janes has accepted a position as designer with Pioneer Woolen Mill, Pittsfield, Me.

Chas. N. Taylor, who has been dyer for twelve years at the Tremont & Suffolk's Mill at Lowell, has now taken charge of dyeing with the Falls Company, Norwich, Conn.

Israel Bell, formerly overseer of carding at the Hebron Cotton Mills, Hebronville, Mass., has resigned.

John Clancy, finisher for the Meriden Woolen Company, Meriden, Conn., has resigned and gone to the Vernon Woolen Company, Vernon, Conn.

John Pooler, formerly overseer of carding at Haile & Frost, Hinsdale, N. H., has resigned and accepted a position at Scranton, Pa.

F. C. Cushing of Ashuelot, N. H., is now designer at C. A. Root & Company's mill at Uxbridge, Mass.

Ray A. Pritchard, formerly with the Huntsville Mills, Huntsville, Ala., has returned to Little Rock, Ark., from Fort Riley, Kans.

W. H. Brigham, for the past five years overseer of spinning at Richland Mills, Columbia, S. C., is now overseer of spinning at Fairfield Cotton Mills, Winnsboro, S. C.

J. W. Greer has resigned as carder at the Ninety-Six Cotton Mills, Ninety-Six, S. C., and has accepted a position with the Franklin Mills, Greers, S. C.

Arthur Culberson, assistant superintendent at the Camperdown Mills, has resigned a position as superintendent at the Huguenot Mills, Greenville, S. C., succeeding T. J. Hadfield, who has returned to his home in Philadelphia.

Otis N. Pierce has been elected president of the Grinnell Mfg. Corporation, to succeed the late Edw. Kilburn, and Joseph W. Webster, for a number of years bookkeeper at the mill, was elected treasurer to succeed Mr. Pierce.

A. Lockwood Danielson of Providence has been elected treasurer of the Slater Cotton Co. of Pawtucket, to succeed Albert Burgess, who recently resigned to connect himself with a new concern.

Frank McKay, master mechanic of the Union Cotton Mill at Moosup, has resigned to go to Nova Scotia, and has been succeeded by Wm. Braiswell of Attawaugan.

Deaths.

Edward Kilburn, one of the best known cotton manufacturers in the country, died August 1st, at his home in New Bedford, Mass. Mr. Kilburn was born in Walpole, N. H., in 1832. He became superintendent of what is known as the "Ann and Hope" mills of the Lonsdale Co., in Lonsdale, R. I., and left there in 1874 to take the position as agent of the Wamsutta group of mills, which he held until 1887, when he retired from active business. He retained, however, his directorship with the various companies. At the time of his death he was director and president of the Grinnell Mfg. Corp., director and president of the Kilburn Mills, and a director in the Potomska Mills. He was for a time president and treasurer of the New Bedford Spinning Co., now a part of the New England Cotton Yarn Co.

George W. Stout, president of the Easton Silk Co., of Easton, Pa., was found dead in his bed July 27th. Death was due to heart failure caused by a fall two years ago. Mr. Stout was secretary and treasurer of the Fire Insurance Co. of Northampton County for the past half a century.

Samuel Porter, formerly superintendent of the Nonotuck Silk Co., died at his home at Florence. He had been in failing health for some time. His connection with the Nonotuck Company extended over a period of fifty years and he was widely known and esteemed in the community.

Daniel W. Taft died at his home in Uxbridge, Mass., July 27th, at the age of 73, of Bright's disease. He had been connected with the textile industries all his life. For many years he operated the Stanley Woolen Mills, then came to Boston as a member of the wool firm of Hobbs, Taft & Co., and afterwards was treasurer of the Taft-Pierce Co. of Woonsocket, machine builders. In 1902 he retired from active business. He had been vice-president and director of the Blackstone Bank and trustee of the Uxbridge Savings bank for many years, and had held important offices in town and county, and served term in the legislature. Mr. Taft leaves a wife, son and two daughters. Royal C. Taft, ex-governor of Rhode Island, was a brother.

Harry E. Parker, superintendent of manufacturing of the Amoskeag Mfg. Co., died suddenly at his home on August 1st. He was 43 years old.

William Somerset Davis, a manufacturer of woolen goods, died at his home, 133 Walnut Lane, Manayunk. He was born in Manayunk, Aug. 21, 1866, and was a son of Annie B. and Ferdinand Davis. His grandfather, George Davis, was one of the earliest settlers of that part of the city. After acquiring a knowledge of manufacturing by practical experience, William began business for himself about ten years ago in the Rupks Mills on Canal Bank opposite Carson Street.

Nathan Hale Baker, one of the best known business men of Providence, R. I., died August 5th at his residence in that city. He was born in Providence in 1884. He was interested for many years in the cotton manufacturing industries of the state, being for a long time with the Bolton Bleacheries, and later holding for over a decade a prominent position with the Richmond Print Works. For the past few years he has conducted a commission merchant's business. He leaves a family of three daughters and two sons, besides the widow.

Isaac Smith, foreman of the press room and mohair department of the D. Goff & Sons Mill at Pawtucket, R. I., died at his home at 33 Denver St., after a short illness, due to the weakened condition of the blood. The deceased had formerly been a resident of Central Falls and at one time represented the fifth ward of that city in the common council. Mr. Smith was born in England in 1851 and came to this country in 1882. He was foreman of the press room for the Glenlyon Dye Works of Saylesville for a number of years and he was later engaged by D. Goff & Son and considered an exceptionally good workman.

Samuel Porter, superintendent for the Nonotuck Silk Mills, North Hampton, Mass., died at the age of seventy-seven years. He was a native of Chesterfield. He retired from active work three years ago, after fifty years' active service with the silk company, most of the time as superintendent.

William Somerset Davis, a manufacturer of woolen goods, died at his home, 133 Walnut Lane, Manayunk, Philadelphia, Pa. After acquiring a knowledge of manufacturing by practical experience, he began business for himself about ten years ago in the Ripka Mills, manufacturing woolen carpet, rug, cloaking and fringe yarns. He was 40 years of age.

Lucius L. Dimock, Leeds, Mass., died recently at his home, age 80 years. His death was unexpected, though he had for a number of months been failing because of a general breaking down on account of his advanced years. Mr. Dimock was a native of Connecticut, was born in Tolland, where he spent part of his life in that town and becoming interested in the manufacture of silk, he removed to North Hampton, Mass., about fifty years ago, going to Leeds and entering the employ of the silk company. He arose from one position to another until he became director of the company, the position that he held for many years. He was particularly interested in the Leed's Mill of the Nonotuck Company. Mr. Dimock is survived by one daughter, Mrs. Samuel W. Lee, of Leeds. His wife died many years ago.

Thomas Chapman, for fifty-four years prior to August 1, 1903, engineer for the Globe Woolen Company, Utica, N. Y., died in that city at the age of 84 years.

Joseph Costello, overseer of the finishing room of the Wilton Woolen Company, N. H., for five years, accepted a like position for the American Woolen Company in Collingsville, Mass.

Horace D. Curtiss, Woodbury, Conn., a prominent woolen manufacturer of this town, died at the age of 65 years. Mr. Curtiss was also prominent in politics about here, being in the state senate in 1885-86, and a representative in 1864-68. He was a member of the last constitutional convention. Mr. Curtiss was president of the Woodbury Water Company and the Electric Company. A widow, one son and a daughter survive him.

John Kitchenman, pioneer dyer and bleacher of Philadelphia, Pa., died of old age at his home, York and Howard streets. Mr. Kitchenman was 84 years old. He was a Mason for fifty-six years. Mr. Kitchenman became a Mason as a member of Lodge No. 9. His membership dated from April, 1850, and was the oldest in the lodge. Shortly after he emigrated to this country from Yorkshire, England, Mr. Kitchenman became an apprentice and later the owner of a dyeing establishment near Seventh Street and Girard Avenue. When he was 32 years old he erected a big establishment at Hope and York streets, which he owned and operated until ten years ago, when he retired.

Charles J. Kennedy, aged 44 years, died Tuesday, August 21, at his late residence, 113 Luray Street, Germantown District, Philadelphia, Pa. He was, many years ago, engaged with Sheppers Bros., woolen manufacturers of Philadelphia. After their failure he engaged with the James E. Mitchell Company, of Philadelphia, cotton yarn commission house, as a salesman; later with Oscar D. Loeb and Harding, Whitman & Company, and was at the time of his death in the employ of the James E. Mitchell Company. He was a member of the I. O. O. F. and other societies and was well known and highly respected by his friends.

Robert Hart, boss weaver and designer at the Talcott Woolen Mills, Talcottville, Conn., died August 15th, aged 53 years. Mr. Hart was overseer of weaving and designing for this company for a number of years. He underwent a surgical operation but was unable to recover from the same.

Joseph Messick, Sr., formerly of the firm of Dailey & Messick, proprietors of the Grove Worsted Mills, Chester, Pa., and at the time of his death vice-president of the Delaware County Trust Co., of Chester, Pa., and also president of the Farson Refrigerator Company, died at the Crozier Hospital, Chester, Pa., August 17, where he had been operated upon for appendicitus. Mr. Messick came to this country from Germany when five years old, his parents settling in Wilmington, Dela. In 1874 he came to Chester, Pa., and embarked in the furniture business. He later began operation of the Grove Worsted Mills with Mr. Dailey. He also established the Farson Company.

David Hughes, formerly overseer of spinning at the Globe Mills, Utica, N. Y., died at his home, August 17, in this city. Mr. Hughes was considered one of the best spinners in the country and was well liked by the help employed under him.

New Publications.

[Any work noticed under this head can be obtained through the office of this journal.]

Textile Design; by Fenwick Umpleby, head of the Department of Textile Design, Lowell Textile School, and Clarence Hutton, Textile Editor of the American School of Correspondence, Chicago.

This is Part IV of the instruction papers on textile design issued by the American School of Correspondence. It begins with a chapter on plain fabrics, after which the following subjects are treated: Spot Weaves; Pile or Plush; Chinchilla; Pique; Jacquard Designs. The explanations given are clear and concise and accompanied by numerous excellent illustrations.

National Association of Manufacturers, Proceedings of the Eleventh Annual Convention, New York, 1906.

This report contains a great deal of valuable information on questions of importance to manufacturers and other business men. The National Association of Manufacturers is the largest organization of its kind in the world and its work has been of great benefit to all American manufacturers regardless of whether they are members of the association or not.

Engraving on Rollers (Traite de la Gravure sur Rouleaux); by Eugene Berthoud, with an introduction by Jos. Depierre; 230 pages, 6 1/2 by 9 1/2; Ch. Beranger, Paris, France. Price $5.00.

This work, which has recently come from the press, treats of the engraving of rollers for textile printing. It begins with a very interesting historical sketch of the various methods of engraving employed in the textile industry and the process of printing textile fabrics. The body of the work is classified under the following heads:

1. Engraving: Tools and Processes Employed.
2. The Various Kinds of Engraving.
3. Special Processes.
4. Accessory Machines and Apparatus.

Under each of these heads the subject is treated in great detail. The work is well illustrated with 230 plates and altogether forms a valuable handbook for the engraver and printer of textiles. The text is in French.

Researches on Cellulose (1900-1905); C. F. Cross and E. J. Bevan; 180 pages, 5 by 8; Longmans, Green & Co., New York. Price $2.50.

This is a continuation of the work issued by the same authors some years ago, entitled "Researches on Cellulose, 1895-1900." The object of this volume is to record the recent advances in the knowledge of cellulose and more especially to contribute to a solution of the problem, What is cellulose? The book deals with the theoretical side of the subject, which, although not of special interest to the practical manufacturer, is a field in which discoveries of great importance in industrial development are made.

Humidification and Hygrometry; by Joseph Winward, Mill Manager, Bolton, England; 17 pages, 7 by 9 1/2; James T. Coop, Bolton, England. Price 50 cents.

This book contains two lectures delivered by Mr. Winward before the Bolton Managers' and Overlookers' Association. He has put in concise form a large amount of practical information regarding humidification and hygrometry and the work will undoubtedly prove a valuable handbook for all engaged in textile manufacture.

Jute and Linen Weaving, Part II.; Thomas Woodhouse, Dundee Technical Institute, and Thomas Milne, Dunfermline Technical School, Scotland; 201 pages, 7 1/2 by 5; Emmott & Co., Manchester, England; Price $2.00.

This is the second part of a book on jute and linen weaving of which the first part, dealing with the mechanical side of the subject, was issued some time ago. The part just received is devoted to calculations and the structure of fabrics, the contents being classified under the following heads: Yarn Counts; Twisted Threads; Warp and Weft Sets and Porters; Warping Calculations; Warp and Weft Calculations; Calculations for Jute Fabrics; Calculations for Linen Fabrics; The Prime Cost of Fabrics; The Analysis of Fabrics; Yarn Diameters and their Structural Values; The Structure of Fabrics.

The work contains a great deal of useful information clearly stated and will undoubtedly prove a useful handbook in the branch of industry to which it relates.

British Imperialism and Commercial Supremacy; by Victor Berard translated from the French by H. W. Foskett, M. A.; Longmans, Green & Co., London, Eng.; price $2.60.

The author has an exceptional faculty of making interesting to the general reader such subjects as free trade and protection, and the development of trade and industry. His task has been lightened in writing this book by connecting ordinarily dry topics with such subjects as national rivalries, which never fail to awaken the interest of the reader. History, geography, philosophy, statistics, biography, the development of trade and industry, the military and commercial contests between nations are all blended in this delightful story, which is told in a sparkling, snappy style peculiarly French. Most of the volume consists in putting well-known facts or opinions in an attractive form. Such discussions are suited for current literature, but it is questionable whether they deserve to be put in the more permanent book form. He has exercised great industry in collecting statements and citing authorities, but has apparently taken very little trouble to verify their accuracy as long as they agreed with his own opinions. For example, being a Frenchman, he looks upon the adoption of the metric system as essential to progress. Consequently he eagerly seizes upon the alleged statement of some English consul at Hanoi that the "Chinese have adopted the metric system." The readers of the Textile World Record have so recently had evidence of the Chinese standards that it is unnecessary to dwell on the ridiculousness of M. Berard's citation.

Handbook for the Color Industry (Handbuch der Farben-Fabrikation); by Georg Zerr and Dr. R. Rubencamp; Steinkopff & Springer, Dresden, Germany.

We have received parts 16 to 20 inclusive of this work, which contain a section on natural mineral colors and the first part of the section on colors from the animal kingdom. The work is illustrated and systematically arranged according to subjects and is unquestionably a valuable addition to the literature on the subject.

Business Literature.

New Engine & Boiler Catalogue.

The James Leffel & Co., Springfield, O., have issued a very handsome and complete new 52 page catalogue, illustrating and describing their line of steam engines and boilers. The details of construction are plainly shown and fully explained, and the catalogue is one that should be in the hands of any prospective purchaser of work in the steam power line. A copy will be furnished free to prospective buyers, stating their wants, and addressing the company as above.

Through Frisco's Furnace; The Joseph Dixon Crucible Co., Jersey City, N. J.

This is an attractive pamphlet showing how well the steel constructed buildings in San Francisco resisted earthquakes, dynamiting and fire. Incidentally it calls attention to the merits of Dixon's silica graphite paint for preserving the steel work so that severe strains can be resisted successfully.

Tentering and Drying Machines; John Heathcote, Providence, R. I.

This is a catalogue of the various styles of tentering and drying machines made by John Heathcote, Providence, R. I. He established the business in 1876 and has developed it to its present large proportions by careful attention to mill requirements.

Warping Machinery and Card Grinders; T. C. Entwistle Co., Lowell, Mass.

An illustrated catalogue in which are described the warping machinery and card grinders built by the T. C. Entwistle Co.

Superheated Steam; Power Specialty Co., Boston, Mass.

This pamphlet calls attention to the Foster patent superheater and in addition to the reading matter contains many illustrations of the superheater machinery, also tables useful to steam users.

Wing's Disc Fan; L. J. Wing Mfg. Co., 136 Liberty St., New York.

An attractive 24-page catalogue in which are illustrated and described the various types of disc fans made by this well-known concern.

The Dyeing of Cotton in Dyeing Machines; Cassella Color Co., New York.

A very useful handbook containing a large amount of information regarding the practical operation of dyeing machines. It is a book that the dyer will keep for reference. While incidentally calling attention to the colors of the Cassella Color Co., its chief value consists in the systematic statement of information regarding machine dyeing, which is now being rapidly adopted.

Clemson Agricultural College, Clemson College, S. C.

We have received a copy of the catalogue of this institution for 1905-6. The department of textile industry is under Prof. Doggett and includes courses in carding and spinning, weaving and designing, textile chemistry and dyeing.

Atlas Slide Valve Engine; Atlas Engine Works, Indianapolis, Ind.

We have received a copy of Bulletin No. 131, which calls attention to the merits of the Atlas single valve engine, a large number of which are in use throughout the country. The simplicity and durability of this engine have been thoroughly demonstrated.

Fibre Cleaning and Drying Machinery.

The Geo. L. Squier Mfg. Co., of Buffalo, N. Y., has just issued a four-page leaflet (in Spanish), descriptive of the Buffalo-Pons fibre machinery, which is adapted for cleaning fibre of all classes. These machines at the present time are built in three sizes and are in use in various parts of the world for handling fibres of all kinds. In addition to the cleaning machines illustrated in this leaflet, the Squier Mfg. Co. also make a Buffalo-Pons fibre baling press, which so bales the fibre after it comes from the drying machines that it goes to the cordage and rope manufacturers in such condition that they can work up this material in continuous lengths as against other presses delivering the fibre in short lengths.

The line of Buffalo-Pons fibre machinery also includes a special dryer for drying the fibre directly after coming from the cleaning machines.

Kapok.

This is a new article of export in Guayaquil (Ecuador), being the fibre of the "Bomba ceiba," or silk-cotton tree. The call for it has come from California, Liverpool, and Belgium. The product is gathered from the districts lying along the coast between Guayaquil and Manta, at Puna, Behia de Caraques, and many other places. The price paid varies from $3.00 to $4.50 per 100 lbs. uncleaned. The loss of weight in cleaning is about 50 per cent., consisting of oily seeds, parts of the pod in which it grew, and the inner core of the pod. There is no doubt that a very large quantity of this could be collected in the country, but for the fact that there is such a scarcity of labor, and that the people in some of the districts where it is gathered find the manufacture of hats more remunerative. The quantity of kapok exported is, so far, small—in 1902, only 21 tons; in 1903, 23 tons; and in 1904, 18 tons.—British Consular Report.

Textile Graduates of the International Correspondence Schools.

The records of the 1906 graduations of students of the textile department of the International Correspondence Schools conducted at New Bedford, Mass., by C. P. Brooks, Principal, have just been completed up to June 30th, 1906, and are as follows:

Complete Cotton Course: Charles F. Brown, 722 Upper 3d St., Evansville, Ind.; John H. Shipp, 428 Ellis St., Augusta, Ga.

Cotton Carding and Spinning Course: Jas. T. Alexander, Mt. Pleasant, N. C.; Michael J. Conley, Hope, R. I.; A. R. Drake, Gate City Cotton Mill, College Park, Ga.; A. L. Eastwood, 229 E. Green St., Louisville, Ky.; Francis Chas. Howard, Spring St., West Easton, Pa.; C. C. Lister, Spartanburg, S. C.; Frank E. Mayotte, 70 Commercial St., Adams, Mass.; Chas. E. Shaver, Huntsville, Ala.; Geo. I. Sidebottom, 16 Quincy St., Passaic. N. J.; John Swindells, 106 Liberty St., Fall River, Mass.; Arthur Thorpe, Piedmont, Ala.; Jno. H. E. Whiting, 37 Burt St., Adams, Mass.

Cotton Spinning and Warp Preparation Course: Wm. Dearden, Uncasville, Conn.; Henry Richard, Jr., Uncasville, Conn.; Peter Thibault, 54 Second St., Norwich, Conn.; Odilon Turcotte, 89 Daniel St., Fitchburg, Mass.

Cotton Warp Preparation and Plain Weaving Course: Roy E. Jones, 276 Bridge St., Manchester, N. H.; John Lachapelle, Ashland St., Jewett City, Conn.

Fancy Cotton Weaving Course: O. J. Ludwick, Lexington, N. C.; W. A. Turner, Warrenville, S. C.

Complete Designing Course: Walter Arbenz, Hazelton, Pa.; Ernest Crowther, 41 O'Hara Ave., Toronto, Ontario, Canada; Alfred J. Guyer, 616 Company St., York, Pa.; Lemuel W. Oquin, Wesson, Miss.; Wm. Worsnop, 29 Lewis St., Central Falls, R. I.; Charles Molter, 90 Canton St., Fitchburg, Mass.

Theory of Textile Designing Course: Jno. Frame, 440 Hart Lane St., Philadelphia, Pa.

Cotton Designing Course: Archibald McNair, 207 Plymouth St., Fitchburg, Mass.

Woolen and Worsted Designing Course: W. E. Hartshorn, 2 Houghton St., Madison, Me.; Thos. Kane, 53 Chase St., Burlington, Vt.; A. J. Victory, Broad Brook, Conn.; Sylva A. Lareau, 611 East School St., Woonsocket, R. I.

Complete Woolen Course: R. G. Williams, Stroudsburg, Pa.

Woolen Carding and Spinning Course: Charles O. Dickenman, Norwich, Conn.; Henry Koehuke, Sheboygan Falls, Wis.; George W. McLean, Fullerton, Cal.; E. C. Powers, Shaw St., Sanford, Me.; M. J. Ryan, Manchester Green, Conn.; John J. Shea, Medway, Mass.; Warren E. Taft, 267 Park St., Kenosha, Wis.; Houston Verga, Muncy, Pa.

Woolen Warp Preparation and Weaving Course: John Collie, 164 Myrtle St., Lawrence, Mass.; A. W. Fairweather, 19 Hicks St., Utica, N. Y.; Frank Felber, Waterloo, N. Y.; Ben Gilbert, 17 Stillwater Ave., Oldtown, Me.; Joseph Latraverse, Chaster St., Woonsocket, R. I.; A. G. Leach, Woodbury, Conn.; C. P. Moors, Lee, Me.

Special: Arthur G. Davis, 4 Phillips St., Watertown, Mass.

The studies of these men have been conducted entirely on the International Correspondence Schools' system by mail from a series of printed lectures studied by the students, from inquiries answered, from examinations corrected and criticised, thus affording a system by which their practical work in the mill is supplemented by theoretical study in the evening, often under adverse conditions or meagre opportunities. The length of time taken for the completion of these courses has occupied from six months to four years according to the opportunities for study, the diligence displayed, and the number of instruction papers in the course. Many of these men have already been advanced to higher positions since they enrolled with the schools.

Aiton Machine Co.

At a recent meeting the following officers were chosen by the Aiton Machine Co.: president, Arthur S. Beves, formerly secretary and treasurer; Thos. A. Aiton re-elected vice president, and Jno. S. Showell, secretary. The company is bringing out some new machinery and is busy on orders.

Finishing Compounds.

The Arabol Mfg. Co., 100 William St., New York, make a specialty of soluble oils, alizarine assistants, sizings and starches. With an extensive practical experience they unite a progressive scientific management, which keeps abreast of the times and in their well equipped laboratory trained chemists are continually experimenting to improve their products and find new ones for the benefit of their customers. They have been very successful in meeting special and exceptional conditions.

Enlargement of Machine Shops.

The Hunter Machine Co., North Adams, Mass., have decided to build an addition to their erecting shop, the new part to be 100 by 50 feet. The additional floor space is required for erecting garnett machines, metallic breasts, etc. This line of work was taken up by the Hunter Machine Co. about a year ago, and the product has been so favorably received by the trade that the development of the business has far exceeded their early expectations.

The Hunter garnett machine is built from new designs and patterns and incorporates new and desirable features. They are made with any number of cylinders, plain or with breast.

The following recent sales of horizontal centre-crank automatic engines completely enclosed, with forced lubrication under 15 lbs. pressure, have been made by B. F. Sturtevant Co. of Boston, Mass.; to High Rock Knitting Co., Philmont, N. Y.; Wrentham Hat Co., Wrentham, Mass.; City & Suburban Home Co., New York City; Missoula Light & Water Co., Missoula, Mont.

Australian Cotton in Liverpool.

The first sale of Australian-grown cotton took place in Liverpool yesterday, July 27, at the salesrooms of Messrs. Brancker, Boxwell & Co., Exchange Buildings, when seventeen bales of a weight of about 230 lbs. each were on offer. There was a poor attendance of buyers. One bale of mixed qualities sold for 6 1/8d. per lb., but the offers for the remainder were unsatisfactory. Two bales of alpaca grown from the kidney seed, yielding about 40 per cent. of lint, went up to 7 3/4d.; for three bales of silk only 7d. was offered, and for three bales of GG wool the highest bid was only 7 5/8d. Eight bales of wool drew a bid of 7 1/2d. In these circumstances the cotton was withdrawn for private sale.—Liverpool Cotton Gazette.

The "Trojan" Bale Tie.

The De Haven Manufacturing Co., 50 Columbia Heights, Brooklyn, N. Y., reports a large increase in the number of mills using the "Trojan" bale tie. It is claimed that owing to the increased cost of jute and sisal rope the "Trojan" is much cheaper than either of these materials. It makes a neat, compact bale and has received the endorsement of a large number of users in foreign countries as well as in the United States.

The De Haven Company recommends the 5/8-inch tie with oil finish for domestic use and the 3/4-inch tie for export. Shippers cannot afford to neglect to investigate this improved method of baling cotton.

A wool conveying system is being installed by the B. F. Sturtevant Co. of Boston, Mass., for the Saranac Mills, Blackstone, Mass.

An Exposition of Safety Devices.

The American Institute of Social Service will hold at 77th Street and Central Park West, New York City, in January next, an exposition of devices for safeguarding the lives and limbs of working men and women, and for preventing accidents under the ordinary conditions of life and labor to which the general public is exposed.

This will be the first exposition of the kind in this country, and it is surprising how far behind other nations we are in this respect.

That expositions and museums have been of real value to countries is evinced by a comparative study of the number of accidents in Europe and in America, which shows that for the same number of men employed in a given trade, we have from two to nine times as many accidents as they have in European countries.

The interest of manufacturers generally is solicited, as well as that of organizations whose special function is to improve the conditions of labor, and a widespread response is looked for to this request for representation in the nature of photographs, descriptive drawings, models, and as far as possible, the devices themselves in actual operation.

Requests for information regarding space should be made to Dr. William H. Tolman, Director, 287 Fourth Avenue, New York.

The new office building in process of erection in connection with the mammoth plant of Wood Worsted Mills, South Lawrence, Mass., is to be equipped throughout with a blower heating system, the apparatus for which, consisting of an engine driven fan and heater, is to be furnished by the B. F. Sturtevant Co. of Boston, Mass.

Recent Textile Patents.

COMBING MACHINES. Sliver Conductor and Apron Guide for Wool. 828,968. James A. Reynolds, Providence, R. I.

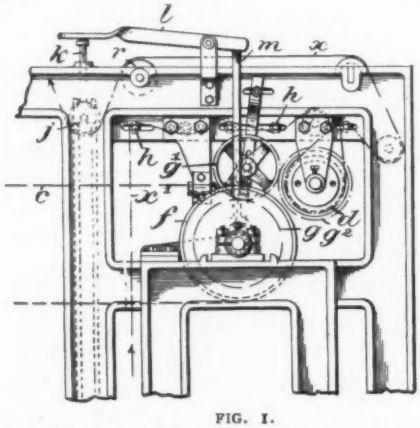


FIG. 1.

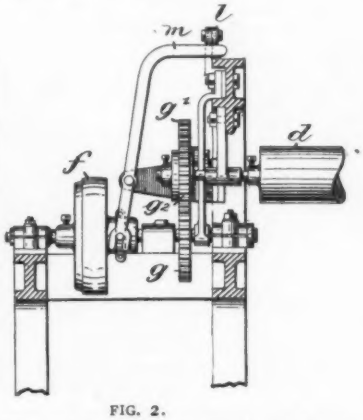


FIG. 2.

FABRICS. Machine for Cutting Weft Pile. 827,430. Oscar Drey, South Reddish, England.

These improvements relate to weft-pile-cutting machines, and principally to those in which the fabric is operated upon in an endless condition and where at some point it is arranged to fall in folds, plaits, loops, or the like.

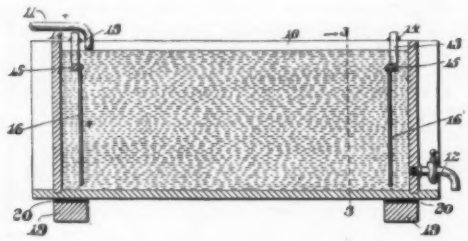
The chief object of the invention is to provide simple and efficient means for maintaining a steady tension in the fabric in its course through the machine and in the process of pile-cutting.

COTTON GIN. 828,668. William H. Kenty, New York, N. Y.

COTTON GIN BREAST HINGE. 828,438. William K. Stone, Hunt, Arkansas.

COTTON. Method of Treating. 827,293. George D. Burton, Boston, Mass.

The invention consists in providing in a suitable tank a bath of water to which sufficient sodium carbonate is added to form a solution capable of producing electrolytic gases, and into which a quantity of wool may be immersed for the purpose of cleansing and degreasing, and then immersing



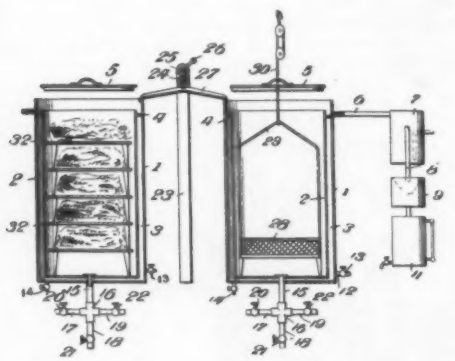
in the same solution a quantity of cotton, cotton fabric, or similar materials, for the purpose of absorbing from the solution a certain amount of grease, in order to give to the cotton or other material an appearance and feel similar to that of wool.

DRYING MACHINE. Continuous Roller. 829,141. Bernhard Cohnen, Grevenbroich, Germany.

FABRIC SCOURING MACHINE. Woven. 827,594. Conrad Wilmsen, Viersen, Germany.

FIBROUS MATERIALS. Apparatus for Separating Oil or Grease from. 825,470. Nathan C. Lane, Philadelphia, Pa.

The object of this invention is to provide a



simple, inexpensive, and efficient apparatus in which oil and grease-soaked waste from machine-shops may be cleaned to permit it to be used again, and the oil and grease removed therefrom may be refined and used for lubricating purposes.

FIBRE MATERIAL from Animal Tendons. Manufacturing. 827,102. Simon Kohn, Vienna, Austria.

LOOM SHUTTLE. 829,259. John V. Cunniff and Joseph Lacroix, Fall River, Mass.

LOOM SHUTTLE. 927,082. Joseph P. Costello, Philadelphia, Pa.

LOOM SHUTTLE and Mechanism Operated Thereby. 828,360. William Williamson, and John Collinson, Manchester, England.

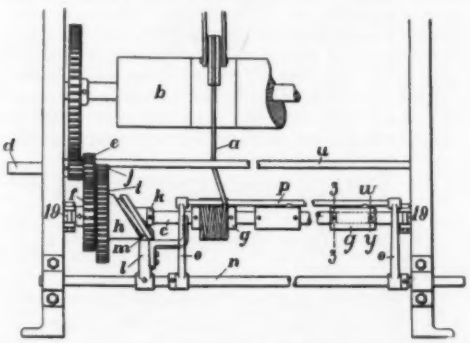
LOOM SHUTTLE MOTION. 829,376. Giovanni Giussani, London, England, assignor to Dyke, Waring, Crisp & Co., London.

LOOM FILLING TENSION and Controlling Means. 828,922. Allan E. Burtt, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM TAKE UP. 827,130. Simon W. Wardwell, Providence, R. I.

LOOM TAKE UP for Narrow Ware. 827,129. Simon W. Wardwell, Providence, R. I.

The purpose of this invention is to provide means whereby during the weaving and in con-



junction therewith tape, ribbon, and similar narrow fabrics shall be wound, preferably in helical coils, to form a self-sustaining package of greater length than the width of the fabric, thereby overcoming the entanglement and loss of time which occurs where the tape is wound in unstable flat coils.

LOOM THIN PLACE DETECTOR. 828,534. William F. Clayton and Cliffon P. Bentley, Atlanta, Ga., assignors to Clayton & Bentley Co.

LOOM THIN PLACE DETECTOR. 828,535. William F. Clayton, Atlanta, Ga., assignor to Clayton & Bentley Co.

LOOM. Weft Replenishing. 827,586. Albert Walker, Arthur Walker and George Walker, Halifax, England.

THREADS. Apparatus for the Production of Artificial. 827,434. Ernst W. Friedrich, Blaton, Belgium.

THREADS from Short Fibre. Manufacture of. 826,859. Carl Kellner, Vienna, Austria-Hungary.

TWISTING MACHINES. Separator for. 828,661. John A. Jamieson, Harrison, N. J.

WOVEN FABRIC. 828,784. William M. Stevenson, Indian Orchard, Mass.

WOOL TREATING Device. 824,121. Thomas F. Johnson, Camden, N. J.

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MACHINERY

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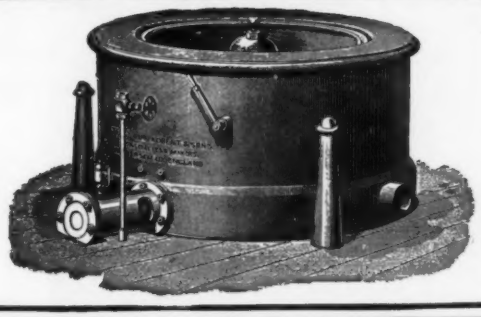

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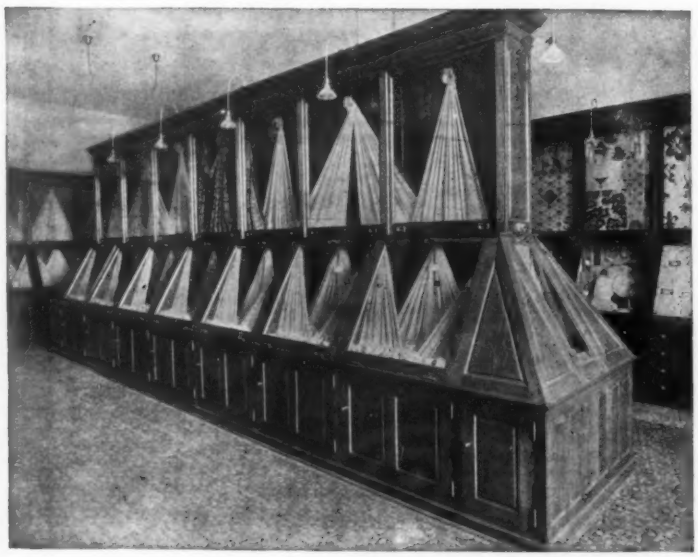
J. W. BAILEY, Principal. **Fall River, Mass.**



The textile field is not overcrowded and a Course of Practical Instruction in all branches of the Cotton Industry will enable you to fill a good-paying position. You may become Manager of Carding, Spinning, Weaving, Designing and Dyeing Departments of Textile Mills. Eventually you may become a Mill Superintendent. Our School offers exceptional advantages. Equipment and facilities acknowledged second to none. Write for full information.

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Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

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Kitson Machine Co.
Leigh, Evan A.
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Philadelphia Textile Machinery Co.
Schofield, Wm., Co.
Woonsocket Machine & Press Co.

Bale Ties.
DeHaven Manufacturing Co.

Balling Machine.
Diamond Textile Machine Works.
Torrance Mfg. Co.

Bandings.
——See under Yarns.

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Morris & Co.

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Gandy Belting Co.
Main Belting Co.
Norwich Belt Mfg. Co.
Shultz Belting Co.
Turner, J. S., Mfg. Co.
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Stephenson Mfg. Co.

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Birdsboro Steel Foundry & Machine Co.

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Mass. Fan Co.
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Boilers.
——See Steam Boilers.

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Pearson, J. T.

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Cling Surface Mfg. Co.

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Leigh, Evan A.
Lowe, Stephen C.
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American Textile Specialty Mchy. Co.
——See Paper Tubes.

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Rice, Barton & Fales Machine & Iron Company.
Taunton, New Bedford, Copper Co.

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Buffalo Forge Co.

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American Textile Specialty Mchy. Co.
American Drying Machinery Co.

Alphabetical Advertising Index, with page numbers, follows this list.

Cotton Machy—cont.
Ashworth Bros.
Barker, James.
Butterworth, H. W., & Sons Co.
Crompton & Knowles Loom Works.
Crompton-Thayer Loom Co.
Curtis & Marble Machine Co.
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Kip-Armstrong Co.
Kitson Machine Co.
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Lowe, Stephen C.
Lowell Machine Shop.
Mason Machine Works.
Metallic Drawing Roll Co., The.
Parks & Woolson Machine Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Providence Machine Co.
Rice, Barton & Fales Co.
Riley, C. E., Company.
Saco & Pettee Machine Shops.
Schofield, Geo. L.
Smith & Furbush Machine Co.
Stafford, G. W., Mfg. Co.
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Textile Finishing Machinery Co.
Whitin Machine Works.
Woonsocket Machine & Press Co.

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Howard & Bullough American Mach. Co.
Kitson Machine Co.
Leigh, Evan A.
Riley, C. E., Company.
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Bosson & Lane.

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Charles, W. B.

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Yale & Towne Mfg. Co.

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Dixon, Jos., Crucible Co.
Lowell Crayon Co.

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Eastman Machine Co.
Langston, Samuel M.

Cutting Machinery.
Eastman Machine Co.

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Crompton & Knowles Loom Works.
Crompton-Thayer Loom Co.
Stafford, G. W., Mfg. Co.

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Hood, R. H.
Metallic Drawing Roll Co., The.

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American Blower Co.
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Arlington Mch. Wks. (Arthur Birch, prop.)
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Birch Bros., Somerville Machine Wks.
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Clark, The Geo. P., Co.

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Bull, William C.
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Ingrahamville Dye Works.
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Pawtucket Dyeing & Bleaching Co.
Peerless Co.
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Leyland, Thos., & Co.
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——See Tanks, Tubs and Vats.

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Fire Pumps.
——See Pumps.

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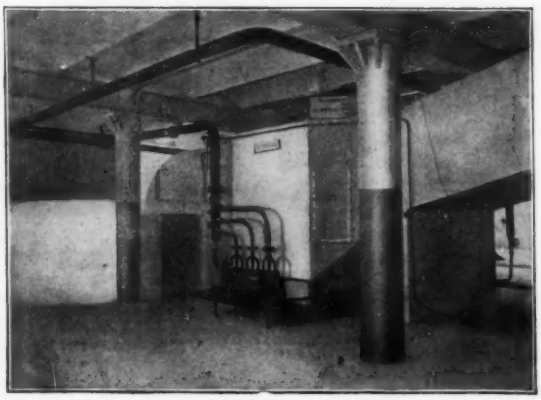
The World Over

The Sturtevant System of Heating and Ventilation



is used where perfection is desired. It was selected for the equipment of the magnificent works of Ludwig, Loewe & Co., at Berlin; a plant that has set the ideal for all others.

Every foot of heating surface is massed in a steel plate casing in connection with the fan which draws air from the purest source, forces it through heater and delivers it under pressure to every part of the building.

Treatise No. 112 tells about the system.

B. F. STURTEVANT CO., BOSTON, MASS.

General Office and Works, Hyde Park, Mass.

New York Philadelphia Chicago London

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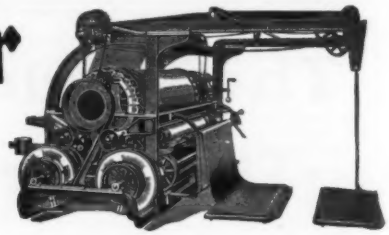
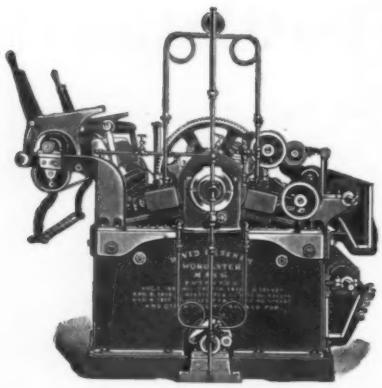
David Gessner

Worcester, Mass.

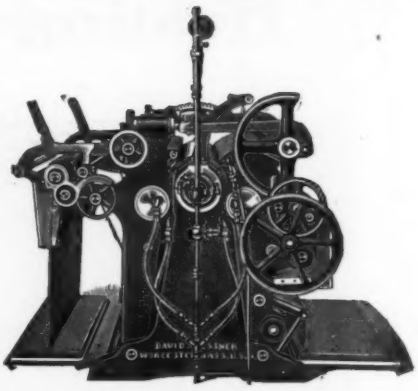




Latest Improved Cloth Finishing Machinery

—

Napping Machines and Presses a Specialty



Flax, Tow, Hemp and Jute Machinery.
Fairbairn-Lawson-Combes-Barbour, Ltd.

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Hood, R. H.
Leigh, Evan A.
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Thurston, A. G., & Son.

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Bodden, Wm., & Son, Ltd.
Hopkins Machine Works.
Leigh, Evan A.

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Buffalo Forge Co.
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—See Clutches.

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Evans, G. Frank.

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Green Fuel Economizer Co.
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Hunt, Rodney, Machine Co.
Hopkins Machine Works.
Hunter, Jas., Machine Co.
Kenyon, D. R., & Son.

Garnetts.
Leigh, Evan A.
Smith & Furbush Machine Co.

Gas Blowers and Exhausters.
Sturtevant, B. F., Co.

Gas Engines.
Jones, Lewis.

Gassing Machines.
Stubbs, Joseph.

Gauges.
Crosby Steam Gage & Valve Co.
Walworth Manufacturing Co.

Gears.
Farrell Foundry and Machine Co.
New Process Raw Hide Co.

Gear Cutting.
Farrell Foundry and Machine Co.

Gear Cutting Machine.
Whiton, The D. E., Co.

Generating Sets.
Buffalo Forge Co.
Crocker-Wheeler Co.
Sturtevant, B. F., Co.

Grate Bars.
Tupper, W. W., & Co.

Grease.
Cook's, Adam, Son.

Gut Cords and Strings.
Wentworth, M. W.

Heating.
—See Ventilating.

Heddles.
Steel Heddle Mfg. Co.
Stoddard, Haserick, Richards & Co.

Hoisting Apparatus.
Economy Engineering Co.
Larrabee, Jno. E.
Yale & Towne Mfg. Co.

Hosiery Boards.
Pearson, J. T.

Hosiery Labels.
Beck, Charles, Paper Co.
Kaumagraph Company.

Humidifying Apparatus.
American Moistening Co.
Bell Pure Air & Cooling Co.

Hydraulic Rams.
Power Specialty Co.

Hydro Extractors.
American Tool & Machine Co.
Broadbent, Thomas, & Sons.
Hunt, Rodney, Machine Company.
Riley, C. E., Company.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.
Whiteley, William, & Sons, Ltd.

Insulating and Braiding Silks.
Sauquoit Silk Mfg. Co.

Insurance, Fire and for Loss of Profits.
Home Insurance Co.

Ironing Machines for Knit Goods.
Craw, J. W., Laundry Machinery Co.

Jacquards.
Halton's Thomas, Sons.

Knit Goods, Edgings, Trimmings, Etc.
Chapin, Geo. W.
Charles, W. B.
Cheney Bros.
Friedberger-Aaron Mfg. Co.
Krout & Fite Mfg. Co.
Weimar Bros.

Knit Goods, Finishing Machines, Crochet, Etc.
Craw, J. W., Laundry Machinery Co.
Eastman Machine Co.
Hunt, Rodney, Machine Company.
Langston, Samuel M.
Merrow Machine Co., The.
Nye & Tredick Co.
Scott & Williams.
Union Special Machine Co.
Willcox & Gibbs Sewing Machine Co.

Knitting Machine Cylinders.
Paxton & O'Neill.
Stafford & Holt.

Knitting Machinery.
Boss Knitting Machine Co.
Brinton, H., & Co.
Claes & Flentje.
Cooper, Chas.
Crane Mfg. Co.
Excelsior Knitting Machine Mfg. Co.
Grosser Knitting Machine Co.
Hemphill Mfg. Co.
Hilscher, G.
Jenckes, E., Mfg. Co.
Jones, Lewis.
Kinsey, Walter.
Koch, Edward W.

Alphabetical Advertising Index, with page numbers, follows this list.

Our Heddle Eye is solid metal

The warp thread has a smooth steel surface to rest on.

They make no fly and collect none. Every user of our Heddles acknowledges this.

Anything that tends to ease the warp thread is of benefit because it tends to lessen broken warp threads.

One proof that our Heddle is easier on the warp threads lays in the fact that we can crowd 50% more of our Heddles in a given space on the heddle frame than any other heddle made.

Tell us the work you want to do and we will send details.

Steel Heddle Manufacturing Co.

1842 Germantown Ave., Philadelphia.

Knitting Mach.—cont.
Lamb Knitting Mach. Mfg. Co.
Leighton Machine Co.
Mayo, Geo. D., Knitting Machine Co.
Mayo Knitting Machine & Needle Co.
National Automatic Knitter Co.
Nye & Tredick Co.
Paxton & O'Neill.
Scott & Williams.
Stafford & Holt.
Standard Machine Co.
Taylor, James.
Tompkins Bros.
Walter & Co.
Walther, Otto.
Wildman Mfg. Co.

Knitting Needles and Supplies.
Breedon's, Wm., Son.
Brinton, H., & Co.
Continental Latch Needle Company.
Cooper, Chas.
Corey, Wm., Co.
Crane Mfg. Co.
Dodge Needle Co.
Excelsior Needle Co.
Grosser Knitting Machine Co.
Ives, Loyal T.
Jarrard Needle Company.
Kolb, Frank E.
Lamb Knitting Machine Mfg. Co.
Manufacturers' Supplies Co.
Mayo Knitting Machine & Needle Co.
Page Needle Co.
Treat, Orion.
Wardwell Needle Co.

Labeling Machines.
Beck, Chas., Paper Co., Ltd.

Lamps, Incandescent.
General Electric Co.
Sawyer-Mann Electric Co.
Westinghouse Electric & Mfg. Co.

Leather.
Bowes, L. M., Co.

Loom Clutches.
Natl. Brake & Clutch Co.

Loom Pickers.
Garland Mfg. Co.

Loom Repairs and Parts.
Glaser Mfg. Co.

Looms.
Crompton & Knowles Loom Works.
Crompton-Thayer Loom Co.
Draper Company.
Kilburn, Lincoln & Co.
Leigh, Evan A.
Lowell Machine Shop.
Mason Machine Works.
Stafford, G. W., Mfg. Co.
Stoddard, Haserick, Richards & Co.
Whitin Machine Works.

Loopers.
Hepworth, John W., & Co.
Leighton Machine Co.

Lubricators.
Cook's, Adam, Son.
Borne, Scrymser Co.
Dixon, Jos., Crucible Co.

Lumpers.
Diamond Textile Machine Works.
Gerry, George, & Son.
Schofield, Wm., Co.

Machinery Dealers.
Jefferson, Ed., & Bro.
Kinsey, Walter.
Lamb, J. K., Textile Mach. Co.
Schofield, Geo. L.
Stead, Arthur.
Taylor, James.

Machinists' Tools.
Whitin, The D. E., Co.

Mails.
Walder, J.

Measuring and Folding Machines.
Curtis & Marble Machine Co.
Elliott & Hall.
Parks & Woolson Machine Co.

Mechanical Draft.
American Blower Co.
Buffalo Forge Co.
Boston Blower Co.
Green Fuel Economizer Co.
Massachusetts Fan Co.
Murphy, Harry F., & Co.
Sturtevant, B. F., Co.

Mechanical Engineers.
American Blower Co.
Buffalo Forge Co.
Dean & Main.
Glaser Mfg. Co.
Murphy, Harry F., & Co.
Philadelphia Drying Machinery Co.
Sturtevant, B. F., Co.

Mercerizers.
Greenwood & Bault, R.
Home Bleach & Dye Works.
Lorrimer, Wm. H., Sons Co.
Luzern Cotton Yarn Co.

Mercerizing Machinery.
Arlington Mch. Wks. (Arthur Birch, prop.)
Butterworth, H. W., & Sons.
Klauder-Weldon Dyeing Machine Co.
Smith, Drum & Co.
Textile Finishing Machinery Co.
Whiteley, William, & Sons, Ltd.

Metallic Fire-proof Window Frames and Sashes.
Badger, E. B., & Sons Co.

Metallic Packing.
Power Specialty Co.

Mill Architects.
——See Architects and Mill Engineers.

Mill Brushes.
——See Brushes.

Mill Builders and Engineers.
Ferguson, John W.

Mill Sewing Machines.
——See Sewing Machines and Supplies

Mill Supplies.
American Supply Co.
Bamford & Smith.
Barker, James.
Buckley's, Benj., Son, Gun Mill.
Crosby Steam Gage and Valve Co.
Easton-Burnham Co.
Eureka Fire Hose Co.
Garland Mfg. Co.
Glaser Mfg. Co.

Alphabetical Advertising Index, with page numbers, follows this list.

Mill Supplies—cont.

Jefferson, Ed., & Bro.
Kolb, Frank E.
Lane, W. T., & Bro.
Leigh, Evan A.
Main Belting Co.
Morris & Co.
Murphy, E. W., & Co.
Norwich Belt Mfg. Co.
Philadelphia Drying Machinery Co.
Riley, C. E., Company.
Richardson Bros.
Shaw, Victor, Ring Traveler Co.
Stephenson Mfg. Co.
Stoddard, Haserick, Richards & Co.
Thurston, A. G., & Son.
Tucker, W. W. & C. F.
Turner, J. S., Mfg. Co.
Ward & Vandegrift.
Walworth Manufacturing Co.

Motors.
——See Electric Motors.

Napping Machinery.
American Napping Machine Co.
Birch Bros., Somerville Machine Wks.
Borchers, Richard C., & Co.
Curtis & Marble Machine Co.
Gessner, David.
Jones, Lewis.
Leigh, Evan A.
Parks & Woolson Machine Co.
Whiteley, William, & Sons, Ltd.

Noils (Silk).
Malcolm Mills Co.
Ryle, Wm., & Co.

Oil Cups.
Tucker, W. & C. F.
Walworth Manufacturing Co.

Oils.
Borne, Scrymser Co.
Cook's, Adam, Son.
Excelsior Wool Oil Compound Co.
Murphy, E. W., & Co.
New York & New Jersey Lubricant Co.
Stephenson Mfg. Co.

Oil Hole Covers.
Tucker, W. & C. F.

Overseaming Machines.
Merrow Machine Co.
Willcox & Gibbs Sewing Machine Co.

Pantagraphs for Mill Engraving.
Johnson, C. A., & Co.

Paper.
Merwin Paper Co.
Richardson Bros.
Smyth, J. L. N., Paper Co.

Paper Boards.
Merwin Paper Co.
Smyth, J. L. N., Paper Co.

Paper Box Machinery.
Beck, Chas., Paper Co., Ltd.
Langston, Samuel M.

Patent Solicitors.
Crosby & Gregory.
Howson & Howson.

Perforated Metals.
Hopkins Machine Works.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co.

Pipes and Fittings.
Murphy, Harry F., & Co.
Pancoast, Henry B., & Co.
Scaife, W. B., & Sons.
Walworth Manufacturing Co.

Plastic Cement.
Griffin Roofing Co.

Pneumatic Conveying.
——See Ventilating.

Portable Hoists.
Larrabee, Jno. E.

Power Transmission Machinery.
American Drying Machinery Co.
American Mfg. Co.
American Pulley Co.
Cresson, Geo. V., Company.
Evans, G. Frank.
Farrell Foundry and Machine Co.
Hunt, Rodney, Machine Company.
Hunter, Jas., Machine Co.
Kilburn, Lincoln & Co.
Latshaw Pressed Steel & Pulley Co.
Philadelphia Drying Machinery Co.
Plymouth Cordage Co.
Saginaw Manufacturing Co.
Schofield, Wm., Co.
Sellers, William, & Co.
Textile Finishing Machinery Co.

Preparatory Machinery (Cotton).
Howard & Bullough Am. Machine Co.
Kitson Machine Co.
Leigh, Evan A.
Riley, C. E., Company.
Saco & Pettee Machine Shops.

Presses.
Boomer & Boschert Press Co.
Butterworth, H. W., & Sons Co.
Curtis & Marble Machine Co.
Gessner, David.
Hart, Charles.
North Chelmsford Machine Co.
Phila. Drying Machinery Co.
Spence & Rideout.
Textile Finishing Machinery Co.
Woonsocket Machine & Press Co.

Press Papers.
Merwin Paper Co.

Pressure Regulators.
Crosby Steam Gage & Valve Co.
Walworth Mfg. Co.

Printing Machinery (Cloth).
Rice, Barton & Fales Machine & Iron Company.

Pulleys.
——See Power Transmitting Machinery.

Pulley Covering.
Warren Company, The.

Pumps.
Goulds Mfg. Co.
Humphrey Machine Co.
Hunt, Rodney, Machine Company.
Murphy, Harry F., & Co.
Textile Finishing Machinery Co.

Pump Governors.
Crosby Steam Gage & Valve Co.
Walworth Mfg. Co.

Purifying & Filtration Plants.
Norwood Engineering Co.
Philadelphia Water Purification Co.
Scaife, W. B., & Sons.
The Hungerford Filter Corp.

Quillers.
Foster Machine Co.
North Chelmsford Machine Co.
Payne, G. W., & Co.

Rag Pickers.
Diamond Textile Machine Works.
Schofield, Wm., Co.
Smith & Furbush Machine Co.

Ramie Tops and Noils.
Tierney, Frank A.

Raw Hide Gears.
New Process Raw Hide Co.

Reed and Harness Manufacturers.
American Supply Co.
Garland Mfg. Co.
Walder, J.

Reducing Valves.
Crosby Steam Gage & Valve Co.
Mason Regulator Co.
Walworth Mfg. Co.

Regulators (Pressure).
Crosby Steam Gage & Valve Co.
Mason Regulator Co.
Walworth Mfg. Co.

Remnants.
Feingold, H. & D.

Ribbons.
Cheney Bros.

Ring Travelers.
DeHaven Mfg. Co.
Shaw, Victor, Ring Traveler Co.

Roofing.
Griffin Roofing Co.
Lincoln Waterproof Cloth Co.
Standard Paint Co.

Roller Coverers.
Turner, J. S., Mfg. Co.

Roller Leather.
Bowes, L. M., Co.
Turner, J. S., Mfg. Co.

Rope.
American Mfg. Co.
Plymouth Cordage Co.

Rope Transmission.
American Mfg. Co.
Cresson, Geo. V., Company.
Hunt, Rodney, Machine Company.
Plymouth Cordage Co.

Roving Cans.
Hill, James, Mfg. Co.

Rubber Rolls.
American Wringer Co.
Boston Belting Co.
Clark, Geo. P.

Ruberoid Roofing.
Standard Paint Co.

Scallop Machines.
Merrow Machine Co.

Schools.
Bradford-Durfee Textile School.
Lowell Textile School.
New Bedford Textile School.
Philadelphia Textile School.

Secondhand Machinery.
——See Mchry. Dealers, also classified Ads.

Separators.
Draper Co., The.

Sewing Machines and Supplies.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros., Somerville Machine Wks.
Curtis & Marble Machine Co.
Dinsmore Mfg. Co.
Fales, L. F.
Kinsey, Walter.
Manufacturers' Supplies Co.
Textile Finishing Machinery Co.
Union Special Machine Co.
Walter & Co.
Willcox & Gibbs Sewing Machine Co.

Shafting, Hangers, Etc.
——See Power Transmission Machinery.

Shearing Machinery.
——See Dyeing, Drying, Bleaching and Finishing.

Sheet Metal Work.
Barney Ventilating Fan Works.
Scaife, W. B., & Sons.
Sterling Blower & Pipe Mfg. Co.

Shell Rolls.
Thurston, A. G., & Son.

Shoddies.
——See Wool Shoddies.

Shuttles.
——See Bobbins, Spools, Shuttles, Etc.

Alphabetical Advertising Index, with page numbers, follows this list.

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Appreciate good roofing and many can attest to the lasting qualities of
RUBEROID ROOFING
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It is the original weather-proof, elastic and acid resisting roofing. Resists the great heat and the acid fumes of dyehouses, etc. Highly fire resisting. Contains no tar. Especially useful on saw tooth roofs. Will outlast tin and iron. Let us send you samples and booklet R.
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Leigh, Evan A.
Mason Machine Works.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.
Silk Mill Supplies.
Hall, I. A., & Co.
Silk Noils.
Fawcett, Hughes.
Singe Plates.
Arlington Mch. Wks. (Arthur Birch, prop.)
Butterworth, H. W., Sons Co.
Taunton, New Bedford Copper Co.
Textile Finishing Machinery Co.
Singeing Machines.
Arlington Mch. Wks. (Arthur Birch, prop.)
Butterworth, H. W., Sons Co.
Curtis & Marble Machine Co.
Knapp, Charles H.
Leigh, Evan A.
Smith, Drum & Co.
Stubbs, Joseph.
Textile Finishing Machinery Co.
Sizing, Starch and Gums.
Arabol Mfg. Co.
Stein, Hirsch & Co.
Skylights.
Drouve, G., Co.
Slag and Gravel.
Griffin Roofing Co.
Slashers.
Cohoes Foundry & Machine Co.
Leigh, Evan A.
Lowell Machine Shop.
Riley, C. E., Company.
Soaps.
Dobbins Soap Mfg. Co.
India Alkali Works.
Nicetown Mfg. Co.
Spindles.
Bamford & Smith.
Bodden, Wm., & Son, Ltd.
Buckley, Benjamin, Sons, Gun Mill.
Draper Company.
Easton-Burnham Co.
Hopkins Machine Works.
Leigh, Evan A.
Riley, C. E., Company.
Stoddard, Haserick, Richards & Co.
Spindle Tubes.
Bamford & Smith.
Riley, C. E., Company.
Stoddard, Haserick, Richards & Co.
Spinning Frames.
—See Cotton Machinery.
Spinning Rings.
Draper Company.
Howard & Bullough American Machine Co.
Whitinsville Spinning Ring Co.
Spinning Tubes.
Buckley, Benjamin, Sons.
Spool Machinery.
Defiance Machine Works.
Spools.
—See Bobbins, Spools, Shuttles, Etc.
Spoolers.
Diamond Textile Machine Works.
Draper Company.
Easton & Burnham Machine Co.
Lindsay, Hyde & Co.
Payne, George W., & Co.
Stacks.
Scaife, W. B., & Sons.
Steam Boilers.
Allen, William, Sons Co.
Murphy, Harry F., & Co.
Scaife, W. B., & Sons.
Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co.
Steam Boxes.
Allen, William, Sons Co.
Steam Engines.
American Blower Co.
Arlington Mch. Wks. (Arthur Birch, prop.)
Buffalo Forge Co.
Hooven (The), Owens & Rentschler Co.
Murphy, Harry F., & Co.
Sturtevant, B. F., Co.
Textile Finishing Machinery Co.
Wing, L. J., Mfg. Co.
Steam Jacket Kettles.
Badger, E. B., & Sons Co.
Steam Pumps.
Goulds Manufacturing Co., The.
Steam Specialties.
Butterworth, H. W., Sons Co.
Crosby Steam Gage and Valve Co.
Mason Regulator Co.
Murphy, Harry F., & Co.
Sturtevant, B. F., Co.
Textile Finishing Machinery Co.
Walworth Manufacturing Co.
Steam Traps.
Albany Steam Trap Co.
American Blower Co.
Moulton, P. A.
Murphy, Harry F., & Co.
Sturtevant, B. F., Co.
Steel Frame Construction.
Scaife, W. B., & Sons.
Stop Motion for Knitting Machines.
Hill, D. H.
Stop Motion for Looms.
—See Warp Stop Motions.
Superheaters, Foster.
Power Specialty Co.
Tanks, Tubs and Vats.
Caldwell, W. E., Co.
Cypress Lumber Co.
Hall, Amos H., Son & Co.
Hopkins Machine Works.
Hunt, Rodney, Machine Company.
Lewis, H. F., & Co.
Murphy, Harry F., & Co.
Textile Finishing Machinery Co.
Scaife, W. B., & Sons.
Woolford, G., Tank Mfg. Co.
Tapes, Braids and Edgings.
Cathcart, John, & Co.
Chapin, George W.
Friedberger-Aaron Mfg. Co.
Krout & Fite Mfg. Co.
Weimar Bros.
Telephones.
Pettes & Randall Co.
Temples.
Draper Co.
Tentering Machines.
—See Dyeing, Bleaching Machinery, Etc.
Tenter Clips.
—See Dyeing, Drying, Bleaching and Finishing Machinery.
Textile Schools.
—See Schools.
Ticketing Machinery.
—See Labeling Machines.
Tiering Machines.
Economy Engineering Co.
Larrabee, Jno. E.

Alphabetical Advertising Index, with page numbers, follows this list.

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Kaumagraph Co.

Trolleys.
Yale & Towne Mfg. Co.

Trucking.
Salvator Transfer, Inc.

Trucks.
Clark, Geo. P.

Turbines.
—See Water Wheels.

Twine.
American Mfg. Co.
Plymouth Cordage Co.
Richardson Bros.

Twisting Machinery.
Smith & Furbush Machine Co.

Valves.
Crosby Steam Gage & Valve Co.
Mason Regulator Co.
Murphy, Harry F., & Co.
Walworth Mfg. Co.

Ventilating Apparatus.
Allington & Curtis Mfg. Co.
Green Fuel Economizer Co.
American Moistening Co.
American Blower Co.
American Drying Machinery Co.
Barney Ventilating Fan Works.
Bell Pure Air & Cooling Co.
Berry, A. Hun.
Boston Blower Co.
Buffalo Forge Co.
Crocker-Wheeler Co.
Drouve, G., Co.
Massachusetts Fan Co.
Murphy, Harry F., & Co.
New York Blower Co.
Nichols, E. M.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sargent's, C. G., Sons.
Schnitzler, Chas. H.
Sirocco Engineering Co.
Sterling Pipe & Blower Co.
Sturtevant, B. F., Co.

Warpers.
Draper Company.
Entwistle, T. C., Co.

Warping and Beaming Machinery.
Altemus, J. K.
Draper Company.
Entwistle, T. C., Co.
Smith & Furbush Machine Co.
Whiteley, William, & Sons, Ltd.

Warp Stop Motions.
American Textile Appliances Co.
Draper Company.
Kip-Armstrong Co.

Washers (Cloth).
Arlington Mch. Works (Arthur Birch, prop.)
Birch, Arthur, Arlington Mch. Works.
Birch Bros., Somerville Machine Wks.
Butterworth, H. W., & Sons Co.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Kenyon, D. R., & Son.
Philadelphia Drying Machinery Co.
Textile Finishing Machinery Co.

Washing Soda.
Ford, J. B., Co.

Watchman's Clocks.
Nans & Co.
Pettes & Randall Co.

Water Chemists.
The Hungerford Filter Corp.
Scaife, W. B., & Sons Co.

Water Purifiers and Filters.
American Water Softener Co.
Hungerford Filtration Co.
Philadelphia Water Purification Co.
Scaife, W. B., & Sons Co.

Water Softeners.
American Water Softener Co.
Ford, J. B., Co.
Hungerford Filtration Co.
Philadelphia Water Purification Co.
Scaife, W. B., & Sons Co.

Water Towers.
Caldwell, W. E., Co.
Tippett & Wood.

Water Wheels.
Dayton Globe Iron Works.
Humphrey Machine Co.
Hunt, Rodney, Machine Co.
Leffel, James, & Co.
Risdon-Alcott Turbine Co.
Smith, S. Morgan, Co.

Water Wheel Governors.
Leffel, James, & Co.

Wheels, Iron and Rubber.
Clark, The Geo. P., Co.

Winders.
Altemus, J. K.
Easton & Burnham Machine Co.
Foster Machine Co.
Leigh, Evan A.
Lindsay, Hyde & Co.
Payne, Geo. W., & Co.
Universal Winding Co.
Whiteley, William, & Sons, Ltd.

Winders (Back).
Taylor, James.

Winders (Hosiery).
Altemus, Jacob K.
Easton & Burnham Machine Co.
Foster Machine Co.
Leighton Machine Co.
Payne, G. W., & Co.
Universal Winding Co.

Winches.
Yale & Towne Mfg. Co.

Wire Stitching Machines.
Beck, Chas., Paper Co., Ltd.

Wood Pulleys.
Saginaw Manufacturing Co.

Woodworking Machinery.
Defiance Machine Works.

Wool.
Stoddard, Haserick, Richards & Co.
Tierney, Frank A.

Wool Oil Compound.
Excelsior Wool Oil Compound Co.

Wool and Waste Dusters.
Leigh, Evan A.
Sargent's, C. G., Sons.
Schofield, Wm., Co.
Smith & Furbush Machine Co.

Wool Cleaning Compound.
Ford, J. B., Co.
India Alkali Works.

Wool Combing Machinery.
Crompton & Knowles Loom Works.
Leigh, Evan A.
Riley, C. E., Company.
Stoddard, Haserick, Richards & Co.

Woolen and Worsted Machinery.
Altemus, Jacob K.
American Drying Machinery Co.
American Tool & Machine Co.
Arlington Mch. Works (Arthur Birch, prop.)
Barker, James.
Birch, Arthur, Arlington Mch. Works.
Birch Bros., Somerville Machine Wks.
Butterworth, H. W., Sons Co.
Crompton & Knowles Loom Works.
Crompton-Thayer Loom Co.
Curtis & Marble Machine Co.
Diamond Textile Machine Works.
Files, L. F.
Firth, William, Co.
Gessner, David.
Harwood, Geo. S., & Son.
Hood, R. H.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Jefferson, Ed., & Bro.
Kenyon, D. R., & Son.
Leigh, Evan A.
Parks & Woolson Machine Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Riley, C. E., Company.
Sargent's, C. G., Sons.
Schofield, Geo. L.
Schofield, William, Co.
Smith & Furbush Machine Co.
Speed & Stephenson.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.
Whiteley, William, & Sons, Ltd.
Woonsocket Machine & Press Co.

Woolen Machinery.
Rice, Barton & Fales Co.

Wool, Non-shrinking Process for.
Heyer, Charles H.

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Excelsior Wool Oil Compound Co.

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Riverdale Woolen Co.
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Alphabetical Advertising Index, with page numbers, follows this list.

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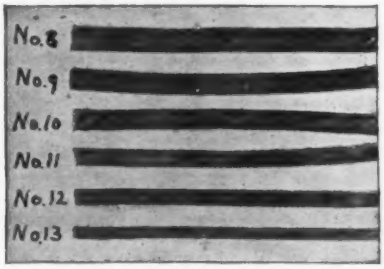

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Orswell Mills.
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Strouse, Theo. H., & Co.

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Fawcett, Hughes.
Littauer, Ludwig.
Sternberg, Fred, & Co.
Tierney, F. A.

Gassed Yarns.
Ballou Yarn Co.
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Littauer, Ludwig.
Lorimer, E. D.
Sternberg, Fred, & Co.

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Ballou Yarn Co.
Chapin, Geo. W.
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Indian Orchard Co.
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Ballou Yarn Co.
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Moore, C., & Co.
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Hosiery and Knitting Yarns.
Boyer, B. F., Co.
Chapin, George W.
Daly, James E.
Greene & Daniels Mfg. Co.
Harding, Whitman & Co.
Hyde, E. S.
Littauer, Ludwig.
Jenckes Spinning Co.
Mitchell, James E., & Co.
Monument Mills.
Skerry, A. T., & Co.
Sternberg, Fred, & Co.

Mercerized Yarns.
Harding, Whitman & Co.
Harper, E. G.
Indian Orchard Co.
Littauer, Ludwig.
Lorimer, E. D.
Lorimer, Wm. H., & Sons Co.
Montgomery, J. R., & Co.
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Mohair Yarns.
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Montgomery, J. R., & Co.

Novelty Yarns, Tinsels, Silk Noils, Etc.
Indian Orchard Co.
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Littauer, Ludwig.
Malcolm Mills Co.
Montgomery, J. R., & Co.
Skerry, A. T., & Co.
Sternberg, Fred, & Co.

Silk Noils.
Tierney, F. A.

Silk Yarns.
Chapin, Geo. W.
Cheney Bros.
Eddy & Street.
Ryle, Wm., & Co.
Sauquoit Silk Mfg. Co.

Spool Cotton.
Warren, W., Thread Works.

Tussah Waste.
Clemoncon, B.

Woolen and Merino Yarns.
Boyer, B. F., Co.
Eaton Rapids Woolen Mills.
Eddy & Street.
Hyde, E. S.
Jenckes Spinning Co.
Littauer, Ludwig.
Salkeld, A. D., & Bro.
Skerry, A. T., & Co.
Solis, Andrew J., Jr., & Co.
Speed & Stephenson.

Woolen Yarns.
Adams, Joseph M., Co.
Littauer, Ludwig.

Worsted Yarns.
Boyer, B. F., Co.
Campion, Richard.
Harding, Whitman & Co.
Littauer, Ludwig.
Pocasset Worsted Co.
Salkeld, A. D., & Bro.
Skerry, A. T., & Co.
Speed & Stephenson.

Alphabetical Advertising Index, with page numbers, follows this list.

A. D. LITTLE.

H. J. Skinner
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Boston Blower Co.
Buffalo Forge Co.
Crocker-Wheeler Co.
Drouve, G., Co.
Massachusetts Fan Co.
Murphy, Harry F., & Co.
New York Blower Co.
Nichols, E. M.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sargent's, C. G., Sons.
Schnitzler, Chas. H.
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Sterling Pipe & Blower Co.
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Altemus, J. K.
Draper Company.
Entwistle, T. C., Co.
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Whiteley, William, & Sons, Ltd.

Warp Stop Motions.
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Draper Company.
Kip-Armstrong Co.

Washers (Cloth).
Arlington Mch. Works (Arthur Birch, prop.)
Birch, Arthur, Arlington Mch. Works.
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Butterworth, H. W., & Sons Co.
Hunt, Rodney, Machine Co.
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Philadelphia Drying Machinery Co.
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Hungerford Filtration Co.
Philadelphia Water Purification Co.
Scaife, W. B., & Sons Co.

Water Towers.
Caldwell, W. E., Co.
Tippett & Wood.

Water Wheels.
Dayton Globe Iron Works.
Humphrey Machine Co.
Hunt, Rodney, Machine Co.
Leffel, James, & Co.
Risdon-Alcott Turbine Co.
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Water Wheel Governors.
Leffel, James, & Co.

Wheels, Iron and Rubber.
Clark, The Geo. P., Co.

Winders.
Altemus, J. K.
Easton & Burnham Machine Co.
Foster Machine Co.
Leigh, Evan A.
Lindsay, Hyde & Co.
Payne, Geo. W., & Co.
Universal Winding Co.
Whiteley, William, & Sons, Ltd.

Winders (Back).
Taylor, James.

Winders (Hosiery).
Altemus, Jacob K.
Easton & Burnham Machine Co.
Foster Machine Co.
Leighton Machine Co.
Payne, G. W., & Co.
Universal Winding Co.

Winches.
Yale & Towne Mfg. Co.

Wire Stitching Machines.
Beck, Chas., Paper Co., Ltd.

Wood Pulleys.
Saginaw Manufacturing Co.

Woodworking Machinery.
Defiance Machine Works.

Wool.
Stoddard, Haserick, Richards & Co.
Tierney, Frank A.

Wool Oil Compound.
Excelsior Wool Oil Compound Co.

Wool and Waste Dusters.
Leigh, Evan A.
Sargent's, C. G., Sons.
Schofield, Wm., Co.
Smith & Furbush Machine Co.

Wool Cleaning Compound.
Ford, J. B., Co.
India Alkali Works.

Wool Combing Machinery.
Crompton & Knowles Loom Works.
Leigh, Evan A.
Riley, C. E., Company.
Stoddard, Haserick, Richards & Co.

Woolen and Worsted Machinery.
Altemus, Jacob K.
American Drying Machinery Co.
American Tool & Machine Co.
Arlington Mch. Works (Arthur Birch, prop.)
Barker, James.
Birch, Arthur, Arlington Mch. Works.
Birch Bros., Somerville Machine Wks.
Butterworth, H. W., Sons Co.
Crompton & Knowles Loom Works.
Crompton-Thayer Loom Co.
Curtis & Marble Machine Co.
Diamond Textile Machine Works.
Fales, L. F.
Firth, William, Co.
Gessner, David.
Harwood, Geo. S., & Son.
Hood, R. H.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Jefferson, Ed., & Bro.
Kenyon, D. R., & Son.
Leigh, Evan A.
Parks & Woolson Machine Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Riley, C. E., Company.
Sargent's, C. G., Sons.
Schofield, Geo. L.
Schofield, William, Co.
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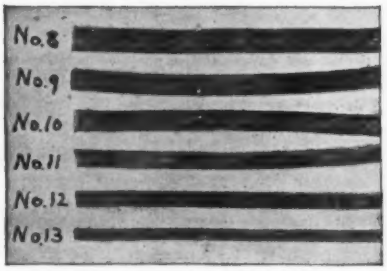

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Harding, Whitman & Co.
Indian Orchard Co.
Jenckes Spinning Co.
Littauer, Ludwig.
Lorimer, E. D.
Mitchell, Jas. E., & Co.
Montgomery, J. R., Co.
Monument Mills.
Orswell Mills.
Salkeld, A. D., & Bro.
Sternberg, Fred, & Co.
Strouse, Theo. H., & Co.

Flax, Hemp, Jute and Ramie.
Fawcett, Hughes.
Littauer, Ludwig.
Sternberg, Fred, & Co.
Tierney, F. A.

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Indian Orchard Co.
Littauer, Ludwig.
Lorimer's, Wm. H., & Sons Co.
Malcolm Mills Co.
Orswell Mills.
Salkeld, A. D., & Bro.
Skerry, A. T., & Co.
Sternberg, Fred, & Co.
Strouse, Theo. H., & Co.

Harness Twine.
Ballou Yarn Co.
Fawcett, Hughes.
Moore, C., & Co.
Sternberg, Fred, & Co.

Hosiery and Knitting Yarns.
Boyer, B. F., Co.
Chapin, George W.
Daly, James E.
Greene & Daniels Mfg. Co.
Harding, Whitman & Co.
Hyde, E. S.
Littauer, Ludwig.
Jenckes Spinning Co.
Mitchell, James E., & Co.
Monument Mills.
Skerry, A. T., & Co.
Sternberg, Fred, & Co.

Mercerized Yarns.
Harding, Whitman & Co.
Harper, E. G.
Indian Orchard Co.
Littauer, Ludwig.
Lorimer, E. D.
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Sternberg, Fred, & Co.
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Indian Orchard Co.
Jenckes Spinning Co.
Littauer, Ludwig.
Malcolm Mills Co.
Montgomery, J. R., & Co.
Skerry, A. T., & Co.
Sternberg, Fred, & Co.

Silk Noils.
Tierney, F. A.

Silk Yarns.
Chapin, Geo. W.
Cheney Bros.
Eddy & Street.
Ryle, Wm., & Co.
Sauquoit Silk Mfg. Co.

Spool Cotton.
Warren, W., Thread Works.

Tussah Waste.
Clemoncon, B.

Woolen and Merino Yarns.
Boyer, B. F., Co.
Eaton Rapids Woolen Mills.
Eddy & Street.
Hyde, E. S.
Jenckes Spinning Co.
Littauer, Ludwig.
Salkeld, A. D., & Bro.
Skerry, A. T., & Co.
Solis, Andrew J., Jr., & Co.
Speed & Stephenson.

Woolen Yarns.
Adams, Joseph M., Co.
Littauer, Ludwig.

Worsted Yarns.
Boyer, B. F., Co.
Campion, Richard.
Harding, Whitman & Co.
Littauer, Ludwig.
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Salkeld, A. D., & Bro.
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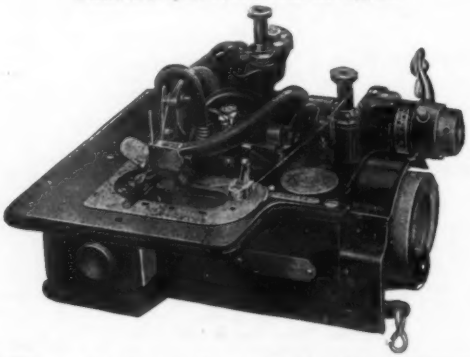

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Alphabetical Index to Advertisements.

Adams, Joseph M., Co. 219
Aiton Machine Co. 38
Albany Steam Trap Co. 31
Allen Sons Co., Wm. 233
Allington & Curtis Mfg. Co. 189
Altemus, Jacob K. 12
American Blower Co. 255
American Drying Machine Co. .. 20
American Dyeing Machine Co. .. 29
American Dyewood Co. ..... —
American Mfg. Co. 59
American Moistening Co. 31-37
American Napping Machine Co.
Outside Back Cover
American Pulley Co., The 27
American Railway Supply Co. .. 54
American Supply Co. 45
American Textile Appliances Co. 36
American Textile Specialty Machinery Co. 14
Am. Tool & Machine Co. 57
American Water Softener Co. ... 55
American Wringer Co. 43
Arabol Mfg. Co., The 233
Arlington Machine Works 43
Ashworth Bros. 45
Atteaux, F. E., & Co. 230
Badger, E. B., & Sons Co. 57
Badger Fire Extinguisher Co. .. 57
Bailey, Frank 234
Ballou Yarn Co. 215
Bamford & Smith 47
Barker, James 52
Barney Ventilating Fan Works 22
Barrett Mfg. Co. 220
Bass, E. L. 198
Beaumont's Limited 235
Beck Paper Co., Chas. 249
Bell Pure Air & Cooling Co. ... 38
Berlin Aniline Works 230
Berry, A. Hun 53
Birch, Arthur 43
Birch Brothers 33-54
Birdsboro Steel Foundry & Machine Co. 16
Bischoff, C., & Co. 231
Blaisdell, Jr., Co., The S. 219
Bodden, Wm., & Son, Ltd. 56
Boomer & Boschert Press Co. .. 210
Borgner, Cyrus, Co. 230
Borne Scrymser Co. 50
Boss Knitting Machine Works .. 246
Bosson & Lane 228
Boston Belting Co. 224
Boston Blower Co. 254
Bowes, The L. M., Co. 18
Boyer, B. F., Co. 216
Bradford Durfee Textile School 182
Breedon's Son, Wm. 252
Brinton, H., & Co. 243
Broadbent, Thomas, & Sons 181
Brophy, T., Sons 226
Brown, W. H. 45
Buckley's, Benj., Son 44
Buffalo Forge Co.
Outside Back Cover
Bull, William C. 245
Butterworth, H. W., & Sons Co. 1
Butterick Pub. Co.
Inside Back Cover
Caldwell, W. E., Co. 230
Campion, Richard 216
Cannon Mills 213
Cassella Color Co. 229
Catlin & Co. 213
Chaffee Bros. Company 43
Chapin, Geo. W. 238
Charles, William B. 219-222
Cheney Bros. 218
Chicago, Milwaukee & St. Paul Railway 235
Claes & Flentje 246
Clark, Geo. P., Co. 55
Cling Surface Mfg. Co. 182
Consolidated Engine Stop Co. ... 192
Continental Color and Chemical Co. 60
Continental Latch Needle Co. .. 252
Cook's Sons, Adam 54
Cooper, Chas. 253
Corey, Wm., Co. 252
Crane Mfg. Co. 246
Craw, J. W., Laundry Mchy. Co. 248
Crescent Chemical Co. ..... —
Cresson, Geo. V., Co. 49
Crocker-Wheeler Co. 51
Crompton & Knowles Loom Works 62
Crompton-Thayer Loom Co. .... —
Crosby & Gregory 197
Crosby Steam Gauge & Valve Mfg. Co. 210
Curtis & Marble Machine Co. .. 33
Cypress Lumber Co. 232
Dana Warp Mills 212
Davidson, J. F. 226
Dayton Globe Iron Works Co. .. 255
Dean & Main 196
Defiance Machine Works 16
De Haven Mfg. Co. 210
Diamond Textile Machine Wks. 50
Dinsmore Mfg. Co. 31
Dixon, Jos., Crucible Co. 57
Dobbins Soap Mfg. Co. 30
Dodge Needle Co. 252
Draper Company 3
Drouve, The G., Co. 231
Eastman Machine Co. 249
Easton-Burnham Co. 21-34
Eaton Rapids Woolen Mills 216
Economy Engineering Co. 27
Eddy & Street 216
Elliot & Hall 56
Entwistle, T. C., Co. 33
Eureka Fire Hose Co. 31
Evans, G. Frank 45
Excelsior Knitting Machine Mfg. Co. 244
Excelsior Needle Co. 252
Excelsior Wool Oil Compound Co. 44
Fairbairn - Lawson-Combe-Barbour, Ltd. 17
Fairhill Bleachery 225
Fales, L. F. 32
Farrell Foundry & Machine Co. 19
Fawcett, Hughes 215
Fawell, Arthur 225
Feingold, H. & D. 194
Felton, S. A., & Son Co. 18
Ferguson, John W. 196
Firth & Foster Co. 225
Firth, William, Co. 30
Ford, J. B., Co. 208
Foster Machine Co.
Outside Back Cover
Friedberger-Aaron Mfg. Co. 239
Frisco System 199
Gandy Belting Co. 51
Garland Mfg. Co. 44
Geisenheimer & Co. 196
General Electric Co. 40
Gerry, W. Geo., & Son ..... —
Gessner, David 186
Glaser Mfg. Co. 196
Goulds Mfg. Co. 56
Grant Yarn Co. 214
Green Fuel Economizer Co. 21
Greene & Daniels Mfg. Co. 212
Greenwood, R., & Bault 226
Griffin Roofing Co. 188
Grosser Knitting Machine Co. .. 241
Haedrich, E. M. 225
Haegler, O. J. 197
Hall, Amos H., Son & Co. 233
Hall, I. A., & Co. 54-56
Halton's, Thomas, Sons 32
Harding, Whitman & Co. 213
Hart, Charles 253
Harwood, Geo. S., & Son 15
Hartford Steam Boiler Inspection & Insurance Co. 32
Heathcote, John, & Son 44
Hemphill Mfg. Co. 251
Hepworth, John W., & Co. 248
Heyer, Charles H. 209
Hill, James, Mfg. Co. 55
Hill, D. H. 214
Hilscher, G. 245
Hoffman, DeWitt & McDonough 216
Hogg, The James, Machine Co. 39
Home Bleach & Dye Works 225
Home Insurance Co. 223
Hood, R. H. 33
Hooven, Owens & Rentschler Co. ..... —
Hopkins Machine Works ..... —
Howard & Bullough Am. Machine Co. 64
Howson & Howson 197
Hungerford Filter Corp., The .. 50
Humphrey Machine Co. 232
Hunt, Rodney, Machine Co. 24
Hunter, Jas., Machine Co. 25
Hyde, Edward S. 219
India Alkali Works 196
Indian Orchard Co. 214
Ingrahamville Dye Works 226
Ives, L. T., Co. 252
Jarrard Needle Works 253
Jefferson, Edw., & Bro. 197
Jenckes, E., Mfg. Co. 242
Jenckes Spinning Co. 214
Johnson, Chas. A., & Co. 225
Jones, Lewis 246
Kalle & Co. 231
Kaumagraph Company 46
Kenyon, D. R., & Son 23
Kilburn, Lincoln & Co. 55
Kinsey, Walter 249
Kip-Armstrong Company 195
Kitson Machine Co. 7
Klauder-Weldon Dyeing Machine Co., The 23
Klipstein, A., & Co. 227-235
Knapp, Chas. H. 48
Koch, Edward W. 245
Kolb, Frank E. 222
Krout & Fite Mfg. Co. 216
Lamb Knitting Machine Co. 247
Lamb, J. K., Textile Mach. Co. —
Lane, W. T., & Bro. 46
Langston, Samuel M. 249
Larrabee, John E. 46
Latshaw Pressed Steel & Pulley Co. 49
Leffel, James, & Co. 254
Leigh, Evan Arthur 11
Leighton Mch. Co. 244
Lewis, H. F., & Co., Ltd. 198
Leyland, Thomas, & Co. 26
Lincoln Waterproof Cloth Co. .. 44
Lindsay, Hyde & Co. 249
Littauer, Ludwig 213
Little, Arthur D. 190
Lorimer, E. D., & Co. 213
Lorimer's, Wm. H., Sons Co. .. 226
Lowe, S. C. 41
Lowell Crayon Co. 249
Lowell Machine Shop 2
Lowell Textile School 230
Luzern Cotton Yarn Co. 225
Main Belting Co. 52
Malcolm Mills Co. 216
Manufacturers' Supplies Co. 252
Mason Brush Works ..... —
Mason Machine Works 10
Mason Regulator Co. 54
Massachusetts Fan Co. 253
Mayo Knitting Machine & Needle Co. 243
Mayo, Geo. D., Machine Co. 238
Merrow Machine Co. 240
Merwin Paper Co. 215
Metallic Drawing Roll Co. 33
Metz, H. A., & Co. 228
Mitchell, Jas. E., Co. 213
Montgomery, J. R., Co. 212
Monument Mills 212
Moore, C., & Co. 214
Morris & Co. 53
Morse, Williams & Co. 53
Moulton, P. A. ..... —
Murphey, E. W., & Co. 52

Murphy, Harry F., & Co. 45
Nanz, T., & Co. 214
National Automatic Knitter Co. 250
National Brake & Clutch Co. ... 35
New Bedford Textile School 250
New England Butt Co. 205
New York Blower Co. 196
New York & New Jersey Lubricant Co. 219
New Process Rawhide Co. 47
Nicetown Mfg. Co. 225
Nichols, E. M. 49
Norwich Belt Mfg. Co., Inc. 196
Norwood Engineering Co. 234
Nye & Tredick Company 238
Orswell Mills 214
Page Needle Co. 252
Pancoast, Henry B., & Co. 232
Parks & Woolson Mch. Co. 27
Pawtucket Dyeing & Bleaching Co. 225
Paxton & O'Neill 248
Payne, Geo. W., & Co. 245
Pearson, J. T. 248
Peerless Company, The 225
Pettes & Randall Co. 215
Philadelphia Drying Mchy. Co... 17
Philadelphia Textile Mchy. Co... 256
Philadelphia Textile School 250
Phila. Water Purification Co. ... 50
Plymouth Cordage Co. 206
Pocasset Worsted Co. 216
Power Specialty Co. 26
Providence Machine Co. 18
Providence Mills Company 226
Rice, Barton & Fales Machine & Iron Co. 19
Richardson Bros. 225
Riley, C. E., Company 181
Risdon-Alcott Turbine Co. 254
Riverdale Woolen Co. 222
Rock Island System 199
Roessler & Hasslacher Chemical Co. 223
Rowland, Samuel 226
Ryle, William, & Co. 218
Saco & Pettee Machine Shops .. 5
Saginaw Mfg. Co. 57
Salem Elevator Works 48
Salkeld, A. D., & Bro. 213
Salvator Transfer, Inc. 194
Sargent's, C. G., Sons 22
Sauquoit Silk Mfg. Co. 218
Scaife, W. B., & Sons 199
Schnitzler, Chas. H. 255
Schofield, Geo. L. 197
Schofield, William, Co. 45
Schwartz, L. H. A., & Co. 39
Scott & Williams 8
Sellers, Wm., & Co. 48
Shaw, Victor, Ring Traveler Co. 43
Shultz Belting Co. 194
Simpson Bros. Corporation 56
Sirocco Engineering Co. 197
Slack, Wm. H. H., & Bro. 222
Smith Brothers ..... —
Smith, Drum & Co. 214
Smith, S. Morgan, Co. 255
Smith & Furbush Machine Co... 256
Smith & Nichols 199
Smythe, J. L. N., Co. 33
Solis, Andrew J., Jr., & Co. 216
Solvay Process Co. 232
Southern Railway 253
Speed & Stephenson 198
Spence & Rideout 249
Stafford, Geo. W., Co. 4
Stafford & Holt 242
Standard Machine Co. 251
Standard Paint Co. 189
Stead, Arthur 197
Steel Heddle Mfg. Co. 187
Stein, Hirsch & Co. 233
Stephenson Mfg. Co. 47
Sterling Blower & Pipe Mfg. Co. 210
Sternberg, Fred, & Co. 213
Strouse, Theo. H., & Co. 215
Stoddard, Haserick, Richards & Co. 191
Stubbs, Joseph 30
Sturtevant, B. F., Co. 185
Suttill, W. F. 198
Sykes, Walter F., & Co. 231
Taunton-New Bedford Copper Co. 232
Taylor, Jas. 240
Tebbetts, E. L., & Co. 45
Textile Machine Works 196
Textile Finishing Machinery Co. Inside Front Cover
Thayer, Edward M., & Co. 233
Thurston, A. G., & Son 44
Tierney, Frank A. 215
Tippett & Wood 13
Tompkins Bros. Co. 251
Toohey, M. J., & Co. 212
Torrance Mfg. Co. 32
Treat, Orion 252
Tucker, W. & C. F. 22
Tupper, W. W., & Co. 255
Turner, J. S., Mfg. Co. 52
Union Special Machine Co. 247
Universal Winding Co. 9
Vacuum Process Co. 51
Walder, J. 43
Walter & Co. 241
Walther, Otto 237
Walworth Manufacturing Co. Outside Back Cover
Ward & Vandergrift 54
Wardwell Needle Co. 252
Warren Co. 20b
Warren, W., Thread Works 215
Weimar Bros. 207
Wentworth, M. W. 191
West Indies Chemical Works, Ltd. 233
Westinghouse Electric & Mfg. Co. 195
Whiteley, Wm., & Sons, Ltd. ... 20
Whitin Machine Works 6
Whitinsville Spinning Ring Co... 43
Whiton, D. E., Machine Co. 18
Wildman Mfg. Co. 236
Willcox & Gibbs Sewing Machine Co. 192
Wilson & Co., Barnsley, Ltd. .. 26
Wing, L. J., Mfg. Co. 222
Wolfenden, C. 199
Wonalancet Co. 207
Woolford, G., Wood Tank Mfg. Co. 234
Woonsocket Mach. & Press Co. 28
Worcester Warp Compressing Machine Co. 42
Yale & Towne Mfg. Co. 55

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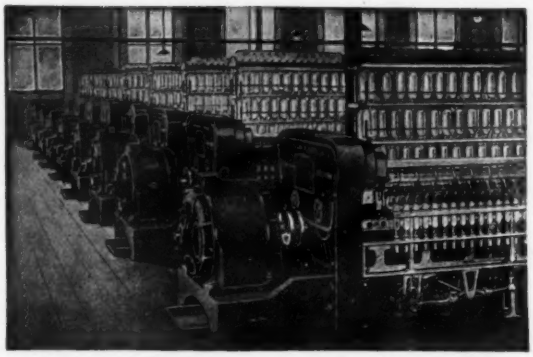

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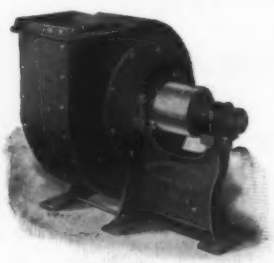

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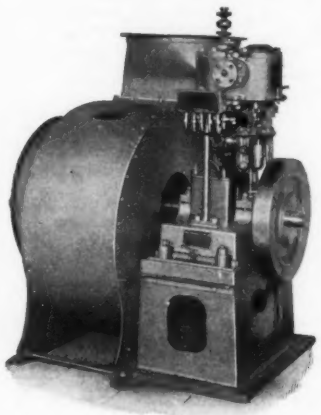

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The following advertisements are a portion of those of superintendents and overseers, of whom full particulars are on file at this office. Manufacturers who may be in need of such men may address them in care of Textile World Record, or state their requirements directly, and the addresses of suitable men will be furnished without charge.

Mr. C. T. Donlevy, a practical mill overseer and superintendent, who has a wide acquaintance with mill men, is now a member of the Textile World Record staff, and gives special attention to this department. He would be pleased to hear from any of his friends who may be interested.

WOOLEN SUPERINTENDENTS.

Manager, Agent, Supt. or Supt. and Designer. Position wanted by a man 57 years of age, English, married, has worked on all classes of woolen and worsted goods, in fancy and piece dyes, from the finest to the coarsest goods. Familiar with all kinds of machinery, has exceptionally good reference, could take a position at once. 3705, Textile World Record.

Supt. and Designer Woolen Mill. Position wanted by a man 46 years of age, married, worked on cassimeres, worsteds, cotton worsteds, kerseys, cheviots, broadcloths, fancy dress goods, cloakings, all kinds of American machinery, first class reference from leading mills and commission houses. 3714, Textile World Record.

Woolen Superintendent of small mill or assistant superintendent in large mills, or boss finisher, by practical mill man raised in the business. Worked through card room, dressing and weave rooms, and all the departments of finishing. Overseer 20 years; strictly temperate; have family; Scotchman. 3200, Textile World Record.

Superintendent of worsted yarn plant or overseer of drawing and spinning. Worked on Australian, English, domestic woolens, mohair, alpaca, spun from 8s to 70s, also carpet yarn. Age 38; American; widower. First-class references. 3221, Textile World Record, Boston.

Woolen Superintendent or overseer of dyeing or finishing. Worked on all kinds of woolen goods, worsted and union. Age 39. Will not go South or West. First-class references. 1210, Textile World Record.

Worsted Superintendent or overseer of combing, spinning and twisting. Worked on mohair, alpaca, all foreign and domestic wools. Familiar with all kinds of machinery; first-class references. Age 45, married. 3248, Textile World Record.

Woolen Superintendent or designer. Familiar with all kinds of fancy worsteds, dress goods, men's wear, fancy cotton dress goods. Familiar with all kinds of American and English machinery. First-class references. English; age 40. Address 3111, Textile World Record.

Superintendent or assistant superintendent. Is open for a position. Has worked on dress goods, suitings, beavers, broadcloths, carriage cloths and some worsted. Age 33, first-class references. 1575, Textile World Record.

Superintendent of woolen mill. Was in business for himself for years. He is now open for a position. Age 52, married, first-class references from commission houses. 3227, Textile World Record.

Superintendent and designer, or assistant superintendent. Age 34; married. Worked on cloths ranging from all cotton to all wool and worsteds, such as cotton worsteds, jeans, army cloths, kerseys, etc. Excellent references. 3148, Textile World Record.

Woolen Superintendent or designer, assistant superintendent and designer. Worked on all kinds of woolen goods, men's wear, dress goods, shirtings and silk goods. 37 years of age, married, American. Good references. 3445, Textile World Record, Boston.

Superintendent or designer in woolen mill. Worked on fancy tweeds, both low and medium, fancy and plain worsteds, beavers, meltons, blankets and rugs. 34 years of age, single, English. Good recommendations. 3448, Textile World Record, Boston.

COTTON SUPERINTENDENTS.

Overseer of Cotton Carding or Supt. of Yarn Mill. Position wanted by a man 38 years of age, married, worked on all kinds of cotton goods and all the different American carding machinery, good reference. 3699, Textile World Record.

Overseer of Weaving or Supt. in a Cotton Mill. Position wanted by a man 40 years of age, married, an American, worked on plain and fancy cotton goods, lawns, muslins, and on fine and coarse numbers, familiar with all kinds of cotton looms, will not go South, first class recommendations. 3716, Textile World Record.

Superintendent and Designer, or Designer. Young man, American, with 4 years' experience as designer. Worked on shirtings and all kinds of elastic and non-elastic webs, on Crompton and Knowles, broad and narrow looms. Will accept a good position anywhere in United States. 3359, Textile World Record, Boston.

Superintendent and Designer. Position wanted by a man 30 years of age, English. Has worked on all kinds of fancy cotton goods, and is familiar with all kinds of cotton looms. Good references. 3682, Textile World Record, Boston, Mass.

Superintendent or assistant superintendent of a cotton mill. Position wanted by a man 29 years of age; married. Is experienced on sheetings, shirtings, ginghams, flannelettes, domets and fancy hosiery yarns. Is expert on colored work. Is familiar with all kinds of American and English carding and spinning machinery. First-class references. 1718, Textile World Record, Boston, Mass.

Cotton Superintendent. Worked on dress goods, shirtings, skirtings, ginghams, cotton flannels and blankets. Familiar with all kinds of cotton machinery. Age 37, married; first-class references. 1432, Textile World Record.

Superintendent of cotton mill, spinning or weaving, assistant superintendent or designer or overseer of weaving, plain or fancy goods. Age 28; English; married; first-class references. 3243, Textile World Record.

Superintendent Small Yarn Mill. American, 26 years of age; worked on carded yarns, 8s to 60s, American cotton, white goods only. Also on all makes American machinery. Would accept position as carder, weaver or designer, where there was a chance for advancement. 3392, Textile World Record, Boston.

Cotton Superintendent or Overseer of Carding in a large mill. Position wanted by a man 44 years of age, married, American. Worked on all kind of goods made in a fine goods mill. First class references. 3489, Textile World Record, Boston.

Cotton Superintendent or Overseer Carding and Spinning in large mill. Position wanted by a man who has had a wide experience on cotton goods, denims, dress goods, lawns, muslins, sheetings, plain and fancy shirtings and flannelettes and napped goods. Made yarns from 6s to 100s. References from leading mills. 42 years, married, American. 3437, Textile World Record, Boston.

Superintendency of cotton mill wanted by a thoroughly practical cotton manufacturer of over 30 years' experience. Age 38; married. Temperate. Good manager. Fully competent to obtain full production at minimum cost and maintain best selling qualities. Highest references given. 1236, Textile World Record.

Superintendent or Agent of Cotton Mill. Position wanted by a man 43 years of age, married, American. Has worked on all kinds of cotton and worsted goods, and is familiar with Draper, Crompton & Knowles, Lowell, Whitin, Mason, Kilbourn and Lincoln looms. Good references. 3669, Textile World Record, Boston, Mass.

WOOLEN WEAVERS.

Overseer of Weaving. Position wanted by a man 42 years of age, American, married, worked on all kinds of woolen and worsted goods, familiar with Crompton & Knowles and Crompton & Thayer and Jacquard looms, first class recommendation. 3694, Textile World Record.

Overseer of Weaving or Second Hand in large mill. Position wanted by a man 41 years of age, an American, married, has worked on cassimeres, fancy worsteds, suitings, dress goods and overcoatings, has had many years' experience in leading mills, understands the Crompton & Knowles looms, good references. 3703, Textile World Record.

Overseer of Weaving. Position wanted by a man 34 years of age, married, American. Has worked on cotton goods, cassimeres, fancy worsteds, and all kinds of woolen goods. Is familiar with Crompton & Knowles looms. Good references. 3687, Textile World Record, Boston, Mass.

Overseer of Weaving. Position wanted by a man 41 years of age, married, German. Has worked on wool and worsted goods of all descriptions, and is familiar with Crompton & Knowles and Crompton Thayer looms. First-class references. 3634, Textile World Record, Boston, Mass.

Overseer of Weaving. Position wanted by a steady, strictly temperate and reliable married man. Has a good record for being a manager of help and a hustler for production. Worked in last place 12 years on all kinds of woolen goods; is now employed. Used to Crompton & Knowles and Crompton & Thayer looms. 3623, Textile World Record, Boston, Mass.

Woolen Boss Weaver. Worked on worsteds, woolens of all kinds, also dress goods. American; 38 years of age; married. 3231, Textile World Record.

Overseer of Woolen Weaving. American, 37 years of age, with experience on fancy cassimeres, cheviots, worsteds, piece dyes and dress goods. Has excellent recommendations. Wishes position in New England. 3401, Textile World Record, Boston.

Overseer of Woolen Weaving. Position wanted by a man 36 years of age; married. Has worked on satinets, unions, cassimeres, men's wear, dress goods, overcoatings and blankets. Is familiar with Knowles, Gilbert, Stafford and Crompton looms. First-class references. 1790, Textile World Record, Boston, Mass.

Overseer of Weaving. Position wanted by a man 39 years of age, American. Has worked on unions, cassimeres, shirtings and overcoatings. Is familiar with Crompton & Knowles looms. Good references. 3601, Textile World Record, Boston, Mass.

Overseer of Weaving, or would consider a good loom fixing job in a woolen mill. Age 47; Protestant; good references. 3247, Textile World Record.

Overseer of Weaving. 40 years of age, with 20 years' experience fixing and weaving in New England. Understands plain and fancy woolens and worsteds. Crompton and Knowles looms. Good references. 3369, Textile World Record.

Overseer of Weaving. 36 years of age, with 18 years' experience in a large mill in Massachusetts. Accustomed to woolens and worsteds, high and low grade, and to all machinery used in weave room. Prefers position in or about New England. 3373, Textile World Record.

Overseer of Woolen Weaving. American, 37 years of age, accustomed to fancy worsteds and woolens, dress goods, etc. Held last position 6 years. Prefers the East. 3397, Textile World Record, Boston.

Overseer of Woolen Weaving, 44 years of age, with experience on woolen and worsted cassimeres, dress goods, overcoatings, etc., and on Knowles and Crompton looms. Would like position in the Middle West. 3385, Textile World Record, Boston.

Asst Supt. or Overseer of Weaving. Position wanted by a man 50 years of age, married and American. Has worked on kerseys, beavers, cheviots, overcoatings, meltons, etc., and is familiar with all kinds of woolen machinery. First-class references. 3528, Textile World Record.

COTTON WEAVERS.

Overseer of Weaving. Worked on ginghams, sheetings, shirtings and dress goods. Familiar with Crompton & Knowles and Mason looms. First-class recommendations, 23 years of age. 3299, Textile World Record, Boston, Mass.

Overseer of Weaving or Cloth Room. Worked on heavy ducks, denims, suitings, checks, lenos, fancy lenos and lappets, from 2s to 200s yarn carded and combed. Familiar with Lowell, Whiting, Crompton & Knowles, Mason and Draper looms. First-class recommendations, 34 years of age, married, American. 3309, Textile World Record, Boston, Mass.

Overseer of Weaving. Position wanted by a man 28 years of age and married. Worked on fancy shirtings, lenos, silk dress goods, lappets and plain goods. Familiar with Jacquard machines, Mason, Crompton & Knowles and Stafford dobbies, looms. 3474, Textile World Record, Boston.

Overseer Cotton Weaving. Position wanted by a man who has had experience on plain goods, twills, sateens on all counts from 18s up. 34 years of age; married. Could take a position at short notice. Worked on Mason, Colvin, Whitin, Lowell and Northrop looms. 3455, Textile World Record.

Overseer of Cotton Weaving. American, 27 years of age, with experience on prints, cambrics, sateens, drills, corded goods, etc. Worked on Draper, Whitin, Lowell, Mason and Cohen looms. Prefers the East. 3430, Textile World Record.

Overseer of Cotton Weaving. American, 45 years of age, with 26 years' experience on plain sheetings, sateens and twills as fixer, second hand and overseer. Able and temperate. Wants position in the East. 3439, Textile World Record.

Foreman of Weaving. Worked on ribbons of all descriptions, silk and cotton labels, tapes and lenos. Will not go to Canada or Maine. Age 34, American. First-class references. 3183, Textile World Record.

COTTON CARDERS.

Overseer of Carding. Position wanted by a man 54 years of age, English, married, has worked on all kinds of stock from the highest to the lowest, also knitting yarns. First class references from leading mills where employed. Could take position at once. 3695, Textile World Record.

Overseer of Cotton Carding. Position wanted by a man 57 years of age, married, American, has worked on all kinds of stock from 3/4 to 1 1/2 staple, all kinds of roving up to 18 hank, first class recommendations. 3713, Textile World Record.

Overseer of Cotton Carding. Position wanted as cotton carder by a Canadian and a hustler, age 42 and married, 27 years' experience in carding department, 13 years as overseer on English and American machinery. Is a good manager of help on colored or white work, fine or coarse numbers. 3719, Textile World Record.

Secondhand in carding or spinning room of cotton mill, or a position setting up carding or spinning machinery. Understands the Dobson & Barlow, Howard & Bullard, Platt Bros. and Curtis machinery. Is 26 years of age; Swedish; worked on coarse yarns from 2s to 50s, on fine yarns from 70s to 100s. Good references from mills in England and Sweden. 3602, Textile World Record, Boston, Mass.

Overseer of Carding. Position wanted by a man 43 years of age, married and American. Has worked on print cloth, cambrics, sheetings, etc., all white cotton. Is familiar with American and English carding machinery. First-class references. 3599, Textile World Record, Boston, Mass.

Overseer of Cotton Carding. Worked on all kinds of yarn. At present employed in a large mill, but will change for a better position. Familiar with all kinds of machinery. Will not go South. 36 years of age; French. 1991, Textile World Record.

Second Hand in card room. American; 30 years of age, with a number of years' experience in cotton card room work. Has worked in large mills in Fall River and New Bedford, and on prints, fine and coarse yarns, and English and American machinery. Prefers a position in the East. 3341, Textile World Record.

WOOLEN CARDERS.

Overseer of Woolen Carding and Spinning. Position wanted by a man 34 years of age, married, an American, has worked on knitting yarns, cotton, wool and shoddy mixes, also woolen goods of all descriptions. Familiar with the D. & F. and J. & D. machines. First class references. 3721, Textile World Record.

Overseer of Carding in Small Mill, or Second Hand in Large Mill. Position wanted by a young man with good references, worked in woolen and knitting mills on D. & F., Lombard, Cleveland cards on all kinds of stock. 3693, Textile World Record.

Overseer of Carding, or Supt. in a Knitting Mill, or Assistant Superintendent in a Woolen Mill. Position wanted by a man 45 years of age, American, married, has worked on all kinds of stock used in a woolen mill or knitting mill, has been overseer in large mills in N. E. S., and has first class recommendations. Understands the American and English machinery. 3704, Textile World Record.

Overseer of Carding, or Second Hand in a large mill. Position wanted by a man 32 years of age, single, has worked on all kinds of woolen and cotton shoddy mixed goods, and also hosiery. Is familiar with D. & F., Barker, Bates, and Bramwell Apperly feeds. Will not go West or South, or Canada. Could take a position at short notice. Good references. 3702, Textile World Record.

Overseer of Carding, or Second Hand in a large mill. Position wanted by a man 36 years of age, married, English, worked on all kinds of yarns—both plain and novelty, shirtings, sheetings and print. Familiar with Saco and Pettee cards and speeders, Lowell, Woonsocket frames, American and English carding machinery. 3696, Textile World Record.

Overseer of Carding. Position wanted by a man 42 years of age, American. Has worked on all kinds of wool, cotton and shoddy mix goods. Is familiar with Cleveland, Lombard and Davis & Furber carding machinery. Good references. 3653, Textile World Record, Boston, Mass.

WOOLEN SPINNERS.

Second Hand in a Woolen Spinning Room. Position wanted by a young man 30 years of age, single, has had a number of years' experience as spinner and has been allowed to fix his own machines. Would like to get a position as second hand where he could learn to fix mules under a good man. He is familiar with D. & F. or J. & B. machines, and wants a position in the West or Middle West. 3707, Textile World Record.

Second Hand in the Woolen Spinning Room. Position wanted by a man 31 years of age, single, worked on all kinds of yarn from 3/4 to 10 run on all kinds of stock, cotton, woolen shoddy, familiar with D. & F. mules and operators. First class refereces. 3715, Textile World Record.

Overseer of Woolen Spinning. Position wanted by a man 40 years of age, widower, worked on all kinds of yarns, wool, cotton and shoddy mixed. Familiar with the J. & B. and D. & F. machines. First class recommendations. 3720, Textile World Record.

Overseer of Spinning, Winding and Reeling in a carpet mill. Position wanted by a man 34 years of age, American. Has worked on all kinds of goods and stock, wool, cotton and shoddy and worsteds. Is familiar with Davis & Furber machinery. Good references. 3678, Textile World Record, Boston, Mass.

Overseer of Spinning, Twisting and Winding. Position wanted by a man 39 years of age, married, American. Has worked on yarns from 7/8 run to 10 run, wool, cotton and shoddy mixes. Is familiar with Davis & Furber and Johnson & Bassett spinning machinery. Good references. 3567, Textile World Record, Boston, Mass.

Woolen Boss Spinner, or would accept a good secondhand position. Familiar with all kinds of American spinning machinery; Davis & Furber, Johnson & Bassett. English mules, Curtis and Platt. First-class references; age 48; English. Could take a position at once. 589, Textile World Record.

COTTON SPINNERS.

Overseer of ring spinning, spooling and warping. Position wanted by a man 32 years of age, American. Has worked on denims, plaids, awnings, checks, lawns, sheetings, lenos, shirtings, etc. Is familiar with Mason, Whitin, Lowell, Davis & Furber and Fales & Jenks, spinning machinery. Good references. 3604, Textile World Record. Boston, Mass.

Overseer of Spinning, Spooling, Warping. Position wanted by a man 35 years of age, married, American. Has worked on all kinds of cotton yarns, from 20s to 120s. Is familiar with Fales & Jenks, Mason, Whitin, Saco & Pettee, and Lowell spinning machinery. Good references. 1788, Textile World Record, Boston, Mass.

Overseer of Spinning, Spooling, Warping. Position is wanted by a man 35 years of age, married, American. Has made yarns from 8s to 80s on all makes of spinning machinery. Worked on all makes of spooling, warping, twisting machines. 3468, Textile World Record, Boston.

Overseer of Ring Spinning. Position wanted by a man 26 years of age. Has worked on all kinds and numbers of cotton yarn. Is familiar with Whitin spinning machinery. Good references. 3684, Textile World Record, Boston, Mass.

Overseer of Mule and ring spinning. Position wanted by a man 35 years of age, married and American. Has worked on cotton yarns from 20s to 120s and is familiar with Parr, Asa Lels, Hetherington, Dobson & Barlow, and Mason new rope mules, and ring frames. Good references. 3516, Textile World Record, Boston, Mass.

Overseer of mule and ring spinning. Position wanted by a man 40 years of age; married; English. Has worked on all kinds and numbers of cotton yarn. Is familiar with all makes of mules. Good references. 3607, Textile World Record, Boston, Mass.

Overseer of Ring Spinning, spooling, long chain beaming, slashing and drawing-in. All kinds of fancies, sheetings, etc. $3.00 per day up. 3202, Textile World Record.

DYERS.

Overseer of Dyeing. Position wanted by a man 51 years of age, married, with A-1 references. Worked on stock for Traction and Army goods, Wood and Bisulphate Vats, Natural and Synthetical Indigo, also stock for cassimeres, blankets, robes, shawls, cotton, wool, shoddy mixes, cotton warps, mercerized effects. 3692, Textile World Record.

Boss Dyer. Worked on low grade wool stock, piece dyes, cap cloths, kerseys and tricots and unions. First-class references. Will go anywhere for a good position. Would make a good man for mill on unions. 26 years of age; American. 3256, Textile World Record, Boston, Mass.

Overseer of Dyeing. Position wanted by a man 48 years of age, married, Scotch. Has worked on all kinds of woolen and worsted goods, stock, yarn and piece dyeing. Is familiar with all kinds of dyeing machinery. Good references. 3632, Textile World Record, Boston, Mass.

Overseer of Dyeing, Bleaching and Scouring. Position wanted by a man 35 years of age, married, American. Has worked on all kinds of knit goods, cassimeres, worsteds dyed in raw stock and in piece. Is familiar with all kinds of dyeing, bleaching and scouring machinery. Good references. 3644, Textile World Record, Boston, Mass.

Overseer of Dyeing. Position wanted by a man 32 years of age, married. Makes a specialty of fast black on hosiery and yarns, rumble and silk finish, also fancy colors and bleaching. Is familiar with all kinds of machinery used in hosiery and yarn dyeing. Good references. 3559, Textile World Record, Boston, Mass.

Overseer of Dyeing. Position wanted by a man 37 years of age, married and American. Has worked on all grades of raw stock, wool, shoddy, cotton and silk noils, pieces for men's wear, dress goods, overcoatings, cloakings, cotton and worsted yarns. Is familiar with all makes of dyeing machinery. Good references. 3548, Textile World Record, Boston, Mass.

FINISHERS.

Overseer of Finishing in Woolen Mill. Position wanted by a man 41 years of age, married, American, finished cassimeres, fancy and cotton worsteds, beavers, meltons, dress goods, first class reference. Can take position at once. 3706, Textile World Record.

Overseer of Finishing. Position wanted by a man 32 years of age, married, American. Has worked on all kinds of cotton worsteds, fancy and piece dyed worsteds and woolens. Is familiar with all kinds of finishing machinery. Good references. 3642, Textile World Record, Boston, Mass.

Overseer of Cotton Finishing. Position wanted by a man 37 years of age, married, Swede. Has worked on all kinds of cotton goods, plaids and stripes, in all departments of the finishing room. Is familiar with Butterworth finishing machinery. Good references. 3638, Textile World Record, Boston, Mass.

Overseer of Finishing. Age 30, American, unmarried, with 6 years' experience as overseer, wants position in New England. Had experience on satinets, unions, and all goods where cotton warp is used, also on nearly all machinery used in making these goods. 3335, Textile World Record.

Overseer of Finishing. 37 years of age, with experience in some of the best mills in New England. Worked on all kinds of woolen and worsted face finished goods and on about all kinds of machinery used in finishing room. Prefers the East. 3344, Textile World Record.

Overseer of Woolen Finishing or assistant superintendent. American, 45 years of age, with knowledge of designing; understands figuring yarns and lay outs; worked on beavers, kersey, woolen and worsted suitings, dress goods, coverts, cassimeres, cheviots, etc., and on all kinds of machinery used in his business. 3415, Textile World Record.

Overseer of Woolen Finishing. 33 years of age, married, with experience on beaver, kersey, cassimere, covert, thibet, worsted, dress goods, government goods, etc. Understands Curtis & Marble, Park & Woolson machines. 3402, Textile World Record.

Overseer of Finishing. American, first-class in every respect, with good references, wants position. Is accustomed to all classes woolen and worsted goods and all kinds of machinery used in his work. 3383, Textile World Record.

Overseer Finishing, or Stock Dyeing and Finishing. Worked on Union cassimeres, satinets, all wool cassimeres, cheviots, dress goods, meltons and kerseys; 39 years of age; single; Scotch, with first-class reference from past employers. 3449, Textile World Record.

Overseer or Woolen Finisher. 42 years of age, with experience on kerseys, meltons, thibets, beavers, broadcloths, worsteds, dress goods and on nearly all classes of woolen and worsteds, wants position in the East. Worked on all machinery used in modern mill in this work. 3432, Textile World Record.

Woolen Boss Finisher. Wet or dry. Worked on meltons, kerseys, friezes, cheviots, fancy cassimeres, thibets, men's and ladies' wear, fancy and cotton worsteds, broadcloths, flannels, blankets and rain cloth. First-class references. Age 35; English. 3113, Textile World Record.

Boss Finisher. Worked on broadcloth, cheviots, kerseys, coverts, thibets, meltons, piece dyes and dress goods. Familiar with all kinds of finishing machinery; prefers a position in Massachusetts. Age 28; American; first-class references. 3046, Textile World Record.

Overseer of Finishing. Worked on kerseys, frigos, cheviots, thibets, cattes, worsted union cassimeres, ladies' dress goods of both high and low stock. Familiar with all kinds of finishing machinery. 29 years of age, married and American. Good references. 3315, Textile World Record.

Overseer of Finishing. Position wanted by an American, 40 years of age and married. Worked on all kinds of woolen and worsted goods and satinets. Familiar with all kinds of finishing machinery. 3475, Textile World Record, Boston.

Overseer of Finishing. Position wanted by an American, 29 years of age, not married. Worked on all kinds of dress goods, face finish worsteds, cheviots and piece dyeing. Familiar with Parks & Woolson, Hunter and all kinds of American machinery. Has good references. 3476, Textile World Record, Boston.

KNITTERS.

Superintendent, or Overseer of Knitting in a Hosiery Mill. Position wanted by a man 33 years of age, single, has worked on ladies', men's and misses' wool, worsted and cotton seamless hosiery on Wildman, Scott & Williams, Ruth and Brinton ribbers, Hepworth and Beatley loopers, Acme and Geor. D. Mayo automatic foot machine. Good recommendations. 3698, Textile World Record.

Superintendent or foreman of knitting. Position wanted by a man 25 years of age, American. Is experienced on men's, women's and children's gloves and mitts, fine-stitch toques and hosiery on worsted and saxony Creelman machines. Is familiar with the Lamb machine, more especially on gloves and mitts, the Brinton full automatic machine and the Creelman hosiery machine. Will be open for engagement about Sept. 1st. First-class references. 3611, Textile World Record, Boston, Mass.

Superintendent or overseer of knitting. Position wanted by a man 41 years of age; married; American. Has worked on all classes of underwear and hosiery on spring and latch needle. Is familiar with all makes of knitting machinery. Good references. 1874, Textile World Record, Boston, Mass.

Superintendent or Overseer in Hosiery Mill. All classes seamless hosiery. Understands Branson and Automatic ribbed toe machines; also Pepper and 3/4 Automatic Excelsior. Age 49; good references. 1441, Textile World Record.

Foreman of Knitting Room. Age 29; American, unmarried. Fleece of all kinds and gauges. Balbriggan from 20 to 30 gauge. Flat work wool goods. Tompkin Bros. and Campbell & Clute machines. Will not go South. 3204, Textile World Record.

Manager of a Hosiery Mill. Familiar with woolen, worsted and cotton and full-fashioned seamless hosiery. 45 years old, American. First-class references. 1657, Textile World Record, Boston, Mass.

Superintendent of Hosiery Mill. American, 40 years of age, with a number of years' experience as overseer, would accept a good position anywhere in United States. Worked on cotton and lisle hosiery, fashioned, seamless, lace, embroidered and plain, and on nearly all makes seamless machines and all others used in an up-to-date mill. 3352, Textile World Record.

Superintendent of Knitting Mill. American, 28 years of age, with experience on flat wool and cotton, all wool sweaters, rib goods of wool, worsted cotton and cotton plaited. Understands nearly all kinds of machinery used in making these goods. 3348, Textile World Record.

Overseer of Knitting. American, 31 years of age, with 10 years' experience in knitting room as second hand and overseer. Worked on men's gauze underwear, and on plain woolen and plush work. Wants position in the East. 3350, Textile World Record.

Superintendent or boss knitter. Worked on men's fine balbriggan, ladies', men's and children's wool underwear. Familiar with all kinds of knitting machinery. 27 years of age; American. 3259, Textile World Record.

Boss Knitter in underwear mill. Worked on all gauges as fine as 28, wool, cotton and silk. Latch and spring needle machines. 39 years of age, American, married. 1669, Textile World Record, Boston, Mass.

Foreman of Cutting Department in a knitting mill, or assistant. Worked on all kinds of knit goods, with four knife or by hand, with knife or shears on fine work. Will guarantee 100 dozen per day. Will not go South or Canada. 24 years of age; American. 3320, Textile World Record, Boston, Mass.

Boss Knitter or second-hand in an underwear mill. Familiar with silk, worsted, cotton and mixed yarn of all kinds. Will not go West, South or to Canada. 32 years of age; American; married. 1819, Textile World Record, Boston, Mass.

DESIGNERS.

Designer. Position wanted by a man 34 years of age, married, American. Is experienced on dress and tie silks, cotton and silk goods, novelty fabrics and ribbons, woolen and worsted Jacquard work. Is familiar with Crompton & Knowles, Stafford, Schaum & Uhlinges Jacquards. First-class recommendations. 3635, Textile World Record, Boston, Mass.

Designer and Assistant Superintendent. Position wanted by a man 36 years of age, married. Is experienced on cheviots, meltons, kerseys, dress goods, overcoatings, cassimeres, piece dyes, etc. Is familiar with all kinds of machinery used in these goods. Good references. 3631, Textile World Record, Boston, Mass.

Designer on Webbing, or Asst. Supt. in a cloth mill. Position wanted by a man 23 years of age, American. Is experienced on worsted and cotton goods, but mostly in the webbing business. Is a graduate of the Lowell Textile School and is familiar with Crompton & Knowles looms. Good references. 3578, Textile World Record.

Designer or Asst. Supt. Position wanted by a man 34 years of age. Has worked on fancy worsteds, cheviots, overcoatings, and cotton worsteds. Is familiar with Crompton & Knowles looms. Good references. 3518, Textile World Record.

Designer. Position wanted by an American, 28 years of age and married. Worked on checks, plaids, madrases, cheviots, woolen and worsted suitings, fancy ginghams, gauzes, lenos, spot effects and novelties, etc. Is familiar with Crompton & Knowles plain and dobby looms, Mason plain and dobby looms and Kilburn & Lincoln plain looms. Good references. 3482, Textile World Record, Boston.

Designer and Assistant Superintendent. Position wanted by a man 31 years of age, married, Scotch. Is experienced on cassimeres, cheviots, coverts, outing rain coatings, piece dyes and has had some experience on worsteds. Is familiar with Crompton & Knowles looms. Good references. 3625, Textile World Record, Boston, Mass.

MISCELLANEOUS.

Wanted. We have an inquiry from a party who is looking for a superintendent for a Bleachery on coarse, heavy sheetings and drills, in a large mill. If interested write to the Overseers' Bureau, care Textile World Record, Boston, Mass.

Wanted. We are continually having calls for first class loom fixers, also dresser tenders. Loom fixers' wages, $15.00 per week, some over. Dresser Tenders from $2.25 to $2.50 per day. If interested, write to the Overseers' Bureau, care Textile World Record, Boston, Mass.

Overseer of Dressing. Worked on all kinds of woolen and worsted men's wear and dress goods. First-class recommendations; 32 years of age; married. 3291, Textile World Record, Boston, Mass.

Bookkeeper in woolen, worsted or yarn mill. Position wanted by an American, 33 years of age, married. Has the best of references. 3477, Textile World Record, Boston.

Wanted: Situation as office manager or bookkeeper by a capable man of long experience. Can take entire charge, or will accept any position paying a fair salary if in line of advancement. Good references. 3521, Textile World Record.

Overseer of Dressing. Position wanted by a man 26 years of age, married. Worked on fancy worsteds and woolens. Could take a position at short notice. Worked on D. & F. dressers and spoolers, Lowell Machine Co. slasher. First class reference. 3480, Textile World Record, Boston.

Overseer Milling, Mercerizing and Bleaching. 45 years of age, with large experience in England and Scotland on all classes of cotton goods and the machinery used in this work. 3414, Textile World Record.

Overseer of Winding, filling, warping or spooling. Has had considerable experience in keeping mill books. Would consider position taking charge of shipping. American; age 26; single; good references. 3242, Textile World Record.

More Power at Less Cost with the Warren Liquid Pulley Cover.

Are you aware that a covered pulley transmits from 25 to 60 per cent. more power than an uncovered one? And you can economize on coal, oil, belts, etc., by simply covering your pulley. Worth while, isn't it?

Why not have every turn of your pulleys mean more profit?

WARREN'S PULLEY COVER removes the cause of your money losing by preserving the belt. Makes every turn of the pulleys count for more dollars.

Start right away to get more power at less cost with Warren's Liquid Pulley Cover—at least write us on the subject.

The Warren Co., Mfgrs., 192 Orleans St., Chicago, Ill.

NEW ENGLAND BUTT COMPANY,

304 PEARL ST., PROVIDENCE, R. I.

BRAIDING MACHINERY

ALL STYLES AND KINDS FOR FLAT AND ROUND BRAIDS.

SOLID SASH AND CURTAIN CORDS,

SHOE AND CORSET LACES, BANDING

AND ALL BRAIDED FABRICS.

ROPE DRIVES

THE possibilities of rope driving should be carefully considered by all large power users.

If you are about to build or remodel your factory you may be confronted with the problem of carrying your power to a distance or in a direction out of line with the driving shaft. In such cases the advantage of the rope drive will be manifest. Distance and direction make no difference to the efficiency of this system.

This, together with many other advantages, such as lack of electrical disturbances, safety, etc., is the reason the rope drive has become a recognized feature in the engineering field.

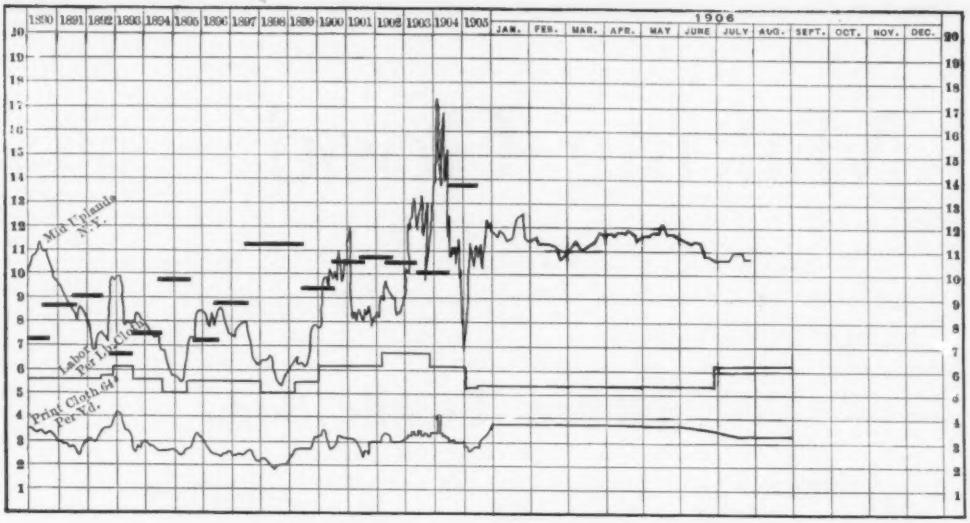
We have given the subject most careful study which will enable us to give expert advice on any questions of this kind that you may have.

Our booklet on "Rope Driving" sent upon request.

Plymouth Cordage Co.,

ESTABLISHED 1824.

North Plymouth, Mass.


1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905
1906
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
Mid Uplands N.Y.
Labor Per Day
Print Cloth 64 Per Yd.

The short, heavy, horizontal lines indicate the size of the cotton crops in millions of bales.
CHART SHOWING RANGE IN THE PRICE OF COTTON TO DATE.

Cotton Market.

The decline in cotton has been brought about by favorable weather in the cotton belt. The present conditions with the new crop almost beyond the reach of damage promise a yield above the average. The movement of new cotton to the seaboard has been exceptionally heavy and buyers of spot cotton have purchased freely at the decline. The movement into sight from Sept. 1 to Aug. 24, practically the entire year, is reported by the Chronicle for a series of years as follows:

1905-06	11,060,413 bales
1904-05	13,562,268 bales
1903-04	10,153,964 bales
1902-03	10,728,682 bales
1901-02	10,565,137 bales
1900-01	10,477,516 bales

An examination of the accompanying chart shows that a decline almost invariably occurs at this time of year when the new crop begins to come on the market. How large the new crop will be cannot now be known, and it is upon this uncertain factor that the course of prices depends. The mills throughout the world never used cotton at a greater rate than at present. The demand for goods is also at a record-breaking height. These conditions and the uncertainty as to this year's supply have caused manufacturers to buy at the recent decline.

The world's visible supply of cotton is estimated by the Chronicle at 1,874,932 bales on Aug. 24, as compared with 2,571,826 bales at same date in 1905, 1,153,569 bales in 1904, and 1,207,270 bales in 1903.

The Pacific Mills of Lawrence after a long trial of the Bell system, have placed a contract for the installation of the Bell humidifiers with the Bell Pure Air & Cooling Co.

Connecticut, Meriden. The Meriden Woolen Company is installing 16 Knowles looms and made alterations in the finishing room. Extensive repairs have also been made in the card room.

WONALANCET COMPANY
NASHUA JUNCTION, N. H.
Manufacturers of a superior grade of
CARDED COTTON
Gulf and Peruvian—in the white
To Meet the Most Exacting Needs of
WOOLEN MILLS

WEIMAR BROS.
MANUFACTURERS OF
Cotton Mercerized Tapes,
SPOOL TAPES, BINDINGS AND NARROW FABRICS FOR UNDERWEAR AND OTHER TRADES.
Phone Connections.
Works, 2046-48 Amber Street, PHILADELPHIA, PA.

Making Good

To tell you that alkalies are helpful adjuncts in mill work is to tell you what you already know. Our purpose is rather to tell you of some of the well defined uses of

Wyandotte Textile Soda

How as a wool and cloth scourer and fuller, soap builder, acid neutralizer and assistant in setting and brightening of colors it has no equal.

There are hundreds of mills who use Wyandotte Textile Soda year in and year out because they know its worth. Then, again, there are doubters just as in the days of old. To them we say let us show you.

Wyandotte Textile Soda is a special chemical compound made expressly for mill work. The secret of its power and success is due to definite known chemical truths. Mills use it because they are pleased with what it does for them. Are you among the number? If not, make a start by sending your regular supply house an order. Write us if you desire further information.

None Genuine except with a card bearing this Trade Mark

In Every Package.

The J. B. Ford Co.,

SOLE MANUFACTURERS,

Wyandotte, Mich.

THIS SODA WAS AWARDED THE HIGHEST PRIZE — GOLD MEDAL — AT BOTH THE ST. LOUIS AND PORTLAND EXPOSITIONS.

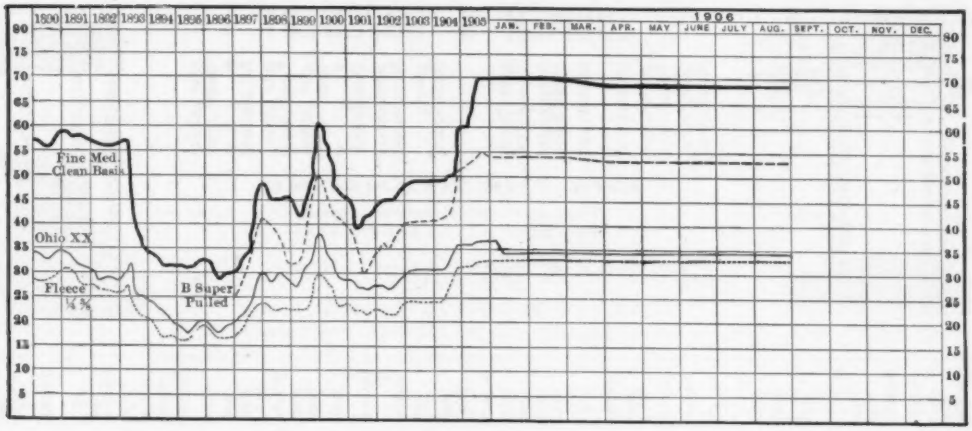


CHART SHOWING RANGES IN THE PRICE OF WOOL TO DATE.

Wool Market.

The increased demand for wool has come principally from worsted yarn and dress goods mills. The regular woolen mills have been taking wool in moderate quantities, but the continued popularity of worsted effects keeps the woolen branch of the business lagging in the rear. Prices have remained steady. The efforts of buyers to secure concessions have not succeeded. On the other hand holders of wool are ready to part with their stock at current quotations, which show a moderate profit. They are apparently convinced that no material advance is possible.

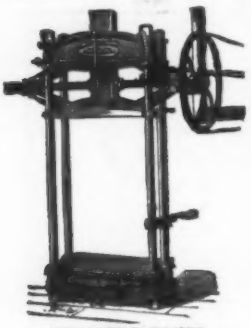
Foreign wool is arriving in reduced volume, the imports for the last month of the fiscal year just closed amounting to 15,102,444 lbs., as compared with 29,802,084 lbs. for the corresponding month last year.

Reports from abroad indicate a strengthening of the wool markets after the recent decline.

Waxes and Oils.

Textile mills, especially finishing and print works, use in different ways considerable wax for special purposes. It is coming into more extended use all the time, and a considerable amount is disposed of among manufacturers. As the demand has increased, Messrs, Smith & Nichols, 48 South St., New York, who are importers and refiners of all kinds of wax, have taken up the requirements of textile trade and are in a position to meet them promptly and at very advantageous prices. Not only do they handle all kinds of wax, but animal, vegetable and mineral oils, greases, stearic acid, etc.

THE ONLY METHOD THAT WILL MAKE WOOL NONSHRINKABLE.
ABSOLUTELY NONSHRINKABLE
FOR WOOL
Hexer-Shrink
Registered.
FOR INFORMATION CHAS. H. HEYER, REAL ESTATE BLDG., PHILADELPHIA, PA.



KNUCKLE JOINT.

BOOMER & BOSCHERT

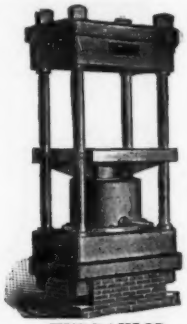
BALING PRESSES

ARE THE STANDARD

Hydraulic or Knuckle Joint
Any Size .. Any Power

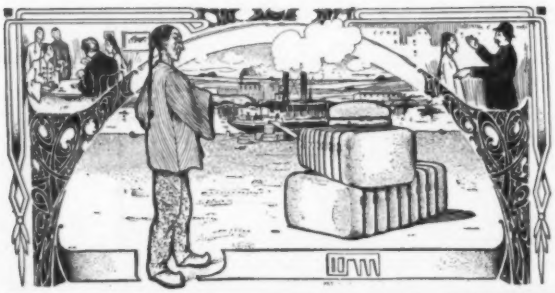
Boomer & Boschert Press Co.

338 West Water S., SYRACUSE, N. Y.
Southern Agent, A. H. WASHBURN, Charlotte, N. C.



HYDRAULIC.

DeHaven's Galvanized Trojan Bale Tie



The heathen Chinese is peculiar but he "buckles" on to a good thing. The U. S. Consular report under date of January 23, 1906, referring to the baling of cotton goods for export to China, states:—"There is a lightweight metal band used by some American mills which is better than any in use..... The metal does not rust by contact with water or dampness as do ordinary iron straps." This refers to our Galvanized Trojan Bale Tie with patent buckle. Send for samples and be convinced.

DeHaven Manufacturing Company,
50 Columbia Heights, Brooklyn, N. Y.

STERLING BLOWER & PIPE MF'G CO.

"STERLING" SYSTEMS

FOR MANY YEARS THE BEST

DUST COLLECTING, WOOL CONVEYING, ETC.

STERLING BLOWER & PIPE MFG. CO.

Write for "1906" Catalog.

HARTFORD, CONN., 1027 Huyshope Ave. New York Office, 136 Liberty St.

A Rigid Examination Reveals No Defects in the

CROSBY SPRING-SAVE GLOBE AND ANGLE VALVE.

NO BETTER VALVE CAN BE MADE.

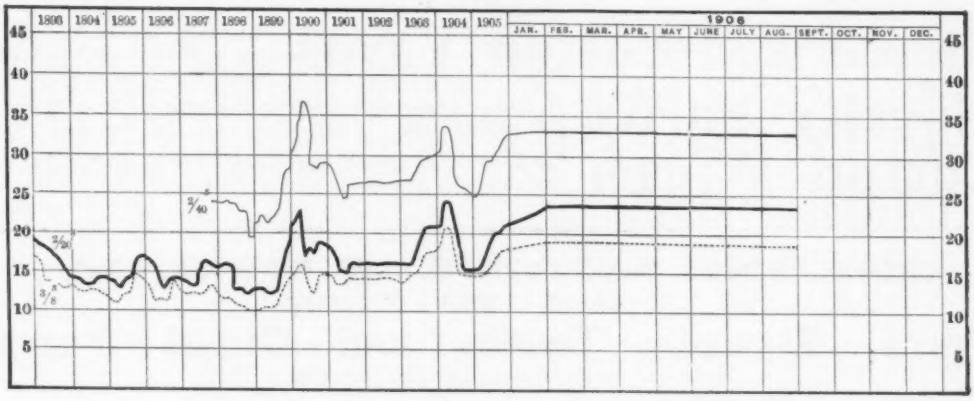
All Working Parts Renewable Without Removal from Piping. ALL PARTS INTERCHANGEABLE. THEY have a full opening through them. WHEN COMPLETED ARE TESTED under more than 400 lbs. pressure. We guarantee them NOT TO LEAK AT HIGH PRESSURES. MADE IN BRASS AND IRON in the various styles furnished to the trade. **Try One or More Valves and BE CONVINCED.**

CROSBY STEAM GAGE AND VALVE CO.

Stores: BOSTON, NEW YORK, CHICAGO, LONDON.

Office and Works: BOSTON, MASS.

Yarn Department.



GRAPHIC CHART SHOWING RANGE OF PRICE OF COTTON YARN TO DATE.

Cotton Yarn Market.

The comparative strength of the yarn market in the face of the decline in cotton has been due to the exceptionally strong position occupied by the spinners. With large contracts still unfilled they can offer an effective resistance to the attempts of buyers to beat prices down. The scarcity of help has interfered with the operation of the mills and reduced the output materially. This has been another factor that has worked against the decline in yarn. Single and coarse yarns have been lower, but fine ply yarn is in good demand at full quotations.

We quote as follows:

Eastern Cops.

6s	18¼
8s	18¾
10s	19¼
14s	20¼
16s	20¾
18s	21¼
20s	21¾
22s	22¼
24s	22¾
26s	23¼
30s	24¼
34s	25
36s	26
40s	28

On cones, ¾c. more up to 14s; 1c. more from 15s to 22s; 1¼c. from 23s to 35s, and 2c. above that.

Eastern Two-Ply Skeins, Carded Peeler.

12s	21½
14s	22
18s	23
20s	24
24s	25
26s	26
30s	29
36s	35
40s	38
45s	41
50s	47
55s	51
60s	55

Eastern Two-Ply Warps, Carded Peeler.

2/30s	29
2/36s	35
2/40s	38
2/45s	41
2/50s	47
2/60s	55

Egyptian Weaving Yarns.
Single Skeins Combed.

30s	38
36s	40
40s	42
45s	45
50s	49
55s	52
60s	55
70s	60

Philadelphia Market.

The cotton market has declined steadily during the last few weeks and in the natural course of events yarn should have declined in proportion, but at this writing the demand for two-ply yarn and for fine numbers in knitting yarn has been good enough to prevent any decided break in price. There has been some softening in the price of this

THE J. R. MONTGOMERY CO.,

Windsor Locks, Conn.

MANUFACTURERS OF

Mercerized Cotton Yarns Gives the High Silk-Like Lustre in Knit Goods and Woven Fabrics.

Novelty Yarns Boucle, Bourette and Spirals, in Cotton, Wool, Worsted, Mohair and Silk.

Cotton Warps on Beams, Jack Spools and Tubes. In Fancy, Twist, Colors and Printed.

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps.

DYE SULPHUR BLACKS DIRECT IN COPS, CONES OR TUBES.

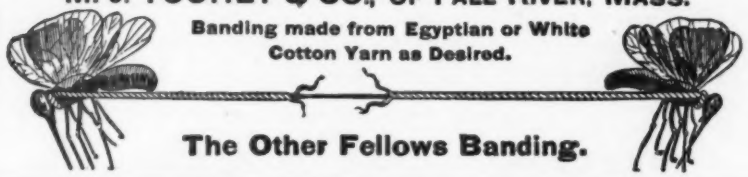
Colored and Bleached Yarns Furnished in any manner desired by the trade.

Pawtucket, R. I.

THESE MULES CANNOT BREAK THE BANDING —MADE BY—

M. J. TOOHEY & CO., OF FALL RIVER, MASS.

Banding made from Egyptian or White Cotton Yarn as Desired.



The Other Fellows Banding.

MONUMENT MILLS,

Manufacturers of White, Colored, Fancy and Double Twist

COTTON WARPS

HOUSATONIC, MASS. 4s to 60s.

Dana Warp Mills

WESTBROOK, ... MAINE

White and Colored Warps 6s to 50s Single and Ply

Mule Cops From 30s to 50s from American & Egyptian Cotton

class of yarn, but not in proportion to the decline in cotton. On single weaving yarn and coarse numbers in knitting yarn the prices have not been so firm, and spinners are not so well sold ahead and are offering prices at reduced figures.

The cotton crop promises a very fair yield, but we are already receiving reports from correspondence to the effect that farmers are beginning to stand for 10 cents for spot delivery. They were very successful last year in maintaining the price by withholding cotton from the market and we believe the same methods will be adopted this year.

We quote prices as follows. The usual difference in price per number does not hold on all counts today, as the extra demand for fine numbers has upset the usual schedule:

Southern frame spun cones:—	
7s and coarser	18½
8s and 9s	18½
10s	19
12s	19½
14s	20
16s	21
18s	22
20s	22½
22s	23
24s	23½
26s	24½
30s	25
40s	33
50s	38
Southern high grade mule yarn:—	
Cones.	
10s	20
12s	20½
14s	21
16s	22
18s	22½
20s and 22s	23-23½
24s	24
Southern frame yarn, lower grades:—	
6s and 8s	18
10s	18½
Eastern cones (high grade quality):—	
10s	21
12s	21½
14s	22
16s	22¾
18s	23¼
20s and 22s	23¾-24¼
Skein yarn (mostly Southern):—	
4s and 8s soft	17½-18
10s to 12s	18½-19
14s to 20s	19½-21
22s	21½
14/2	20
16/2	20½
20/2	22½
30/2	27½
40/2	36
16/3 slack	20½
12/3 slack	19½
8/3 carpet	18

JAMES E. MITCHELL CO., COMMISSION MERCHANTS.
Cotton Yarns
AND COTTON CLOTHS.
122-124 Chestnut Street, PHILADELPHIA, PA.
73 Leonard Street, NEW YORK.
Brown Building, 185 Summer Street, BOSTON, MASS.

CATLIN & CO.,
Cotton Yarns
345 Broadway, NEW YORK.
67 Chauncy Street, BOSTON.
206 Chestnut Street, PHILADELPHIA.
605 Medinah Temple, CHICAGO.

Harding, Whitman & Co.,
Dry Goods Commission Merchants,
COTTON AND WORSTED YARNS.
BOSTON. NEW YORK. PHILA.
CHICAGO. BALTIMORE. ST. LOUIS.

H. D. Salkeld & Bro.
COMMISSION MERCHANTS
With FRED'K VIETOR & ACHELIS
COTTON YARNS
66-72 LEONARD STREET - - NEW YORK

Fred Sternberg & Co.
530 Broadway, - NEW YORK.
MERCERIZED TURKEY RED GASSED } COTTON YARNS.

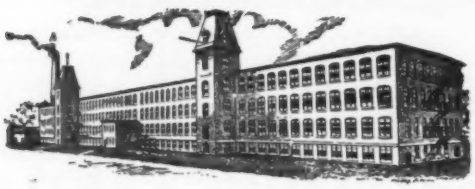
E. D. LORIMER & CO.
COTTON YARNS } ALL NUMBERS
MERCERIZED YARNS } FOR ALL PURPOSES
346 BROADWAY, NEW YORK.

LUDWIG LITTAUER,
Successor to MOELLER & LITTAUER.
SILK, WORSTED, WOOLEN YARNS COTTON AND MOHAIR
Polished Threads and Tinsel. Artificial or Wood Silk.
Mercerized, Turkey Red, Fine Gassed Yarns.
109 GREENE ST., NEW YORK.

Wiscasset Mills Co. | Patterson Manfg. Co.
Efrid Manfg. Co. | Tuscorora Cotton Mill.
HIGH GRADE HOSIERY YARN
White and Colors. All Numbers.
Sewing Twines on Cones and Tubes.
SPECIALTIES IN WEAVING YARN.
Black and white. Double and twist for woolen trade.
CANNON MILLS, 55 Leonard St New York.

C. T. Crocker, Pres. W. F. Stiles, Treas.

ORSWELL MILLS



Fitchburg, Mass.

Capacity, 45,000 Spindles.

HIGH GRADE YARNS

From Egyptian and Peeler Cottons, Carded or Combed, in Chains and Skeins, on Balls, Beams, Spools, Cops, Cones, Tubes, Single or Twisted.

JENCKES SPINNING CO.

Formerly E. JENCKES MFG. CO.

Carded and Combed Cotton Yarns for Weavers and Knitters
Double and Twist Yarns for Woolen Trade.

PAWTUCKET, R. I.

GRANT YARN CO.,

COMBED AND CARDED COTTON.

YARNS 40's and above. AND
FITCHBURG, MASS. WARPS

Just Patented, a new Stop-Motion

For Spring Beard Needles on Round Heads for making Lace Work on Hosiery, Stockinette, Astrakan Cloth, etc.

Breakage of Thread compels Machine to stop instantly.

Machines can be seen at work by addressing

D. H. Hill, 2163 North 9th St., Philadelphia, Pa.

C. MOORE & CO.,

Manufacturers of

TWINES, THREADS AND YARNS,

Jacquard Harness Twines of all kind on hand and made to order.

S.W. Cor. Fifth and Market Sts., Phila.

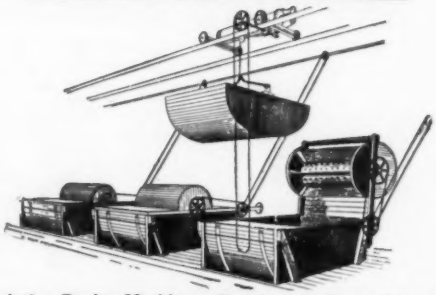
Smith, Drum & Co.

2503-9 CORAL ST., PHILA., PA.

Dyeing Machinery

FOR WARPS AND PIECE GOODS

Bleaching Machines



Circulating Dyeing Machines. For Hosiery, Underwear, Raw Stock and Rags. Singeing Machines for Hosiery. Mercerizing Machines.

WATCHMAN'S CLOCK, LATEST IMPROVED

Portable and Electric.
Controls Night Watchman.
Allowance made for old clocks.

T. NANZ & CO.,
127 Duane St., N. Y.

Indian Orchard Company.
Cotton Warps and Yarns.
In Gray and all Colors, Single or two or more Ply, and Cable Cord.
Novelty Yarns.
in Various Patterns, Colors and Twists.
Carded and Colored Cotton.
For Mixing with wool, Machined or in Roving.
Indian Orchard Mass

8/3 slack	18
9/4 slack	18
Warps (Southern):—	
10s to 12s	18½-19
14s	19¼
16s	19¾
20s to 22s	21-21½
26s	23
14/2	20
16/2	21
20/2	23
24/2	24½
30/2	27½
40/2	36
Mixed colored yarns (mock twist, half colors):—	
6s to 10s	19-19½
12s to 14s	20-21
16s to 18s	21½-22

Mock Egyptian, 2c. advance over white.

Egyptian, 7 to 8c. above best quality white.

Worsted Yarn.

Spinners are beginning to realize that something is going wrong with their orders. What may be in store for the future no one can tell, but prices are so high that as far as English spun yarn is concerned spinners are wanting orders and do not like to face the true condition of the business. Like every other problem there is a reason for this falling off of orders for yarn. One word will explain, and that word is "cotton." The weavers have secured orders, which, to be sure, have been rather unevenly placed. Some have more than sold up their production for the coming season. Others say that not so many orders have been placed as have been reported to be.

So far as the men's wear business is concerned the weavers making certain lines of mercerized worsted and those making cotton worsteds have secured as many orders as can be well handled. The mercerized worsteds require much French spun yarn filling, but the warps are mostly good Southern cotton yarn. The cotton worsteds would blush if worsted yarn were found in the cloth. Certain mills that have used considerable worsted yarn in the past are using thousands of pounds of cotton yarn. The ladies' dress goods weavers are in the same condition. These weavers have been using 2/36s 3/8 Blood quality yarn for warps and followed the advance of the market until $1.05 was reached, an advance of 33 cents per pound. The result of this continued advance

Established 1863 *Incorporated 1893*

W. Warren Thread Works

Makers of High Grade

SPOOL COTTON

of every description for the manufacturing trades

Mills: Westfield, Mass.

LINEN YARN IMPORTER.

HUGHES FAWCETT, 115 Franklin Street, NEW YORK.

Flax, Hemp and Jute Line and Tow Yarns,
For Weaving Purposes.

Linen Jacquard Harness Twines,
Fine Cotton Harness and Heddle Twines,
For Cotton, Silk, Woolen and Carpet Manufacturers.

Correspondence solicited. Samples promptly furnished.

Mercerized and Plain
Skein, Warps, Cones, Cops, Tubes
COTTON YARNS
426 and 428 Market St., Phila.
Theo. H. Strouse & Co.

Ballou Yarn Co.
PROVIDENCE, R. I.

Harness and Seine Twines and other Job Gassing, Winding, etc. All Numbers.

GASSED. YARN. SPECIALTIES

You Save Enough Insurance to Pay for the Equipment.

So it costs you NOTHING to have the AMERICAN WATCHMAN'S CLOCK. Fully approved by all insurance companies. We equip factories with Fire Alarms, Signals, etc., also Employee's Time Recorders, and Telephone Systems. Electric Time System consists of Master Regulator in office with secondary electric clocks throughout the mill, insuring accurate time. Send for particulars.

Pettes & Randall Co., 150 Nassau St., New York

FRANK A. TIERNEY,
206 West Broadway, New York, N. Y.
WOOL, SILK, MOHAIR, CAMEL HAIR, RAMIE.
Ramie Tops, Ramie Noils, Silk Tops, Silk Noils, Ramie Yarns, Silk Yarns, Silk Noil Yarns.

Prepared Tussah Silk for Woolen Manufacturers, ready for immediate use on regular woolen machinery.

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WORSTED YARNS

IN THE GRAY.

Mills at
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French System. **B. F. BOYER CO.,** Bradford System.

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Cotton, Woolen
Yarns and Braids
Worsted, Spun Silk.
PROVIDENCE, R. I.

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SELLING AGENT FOR

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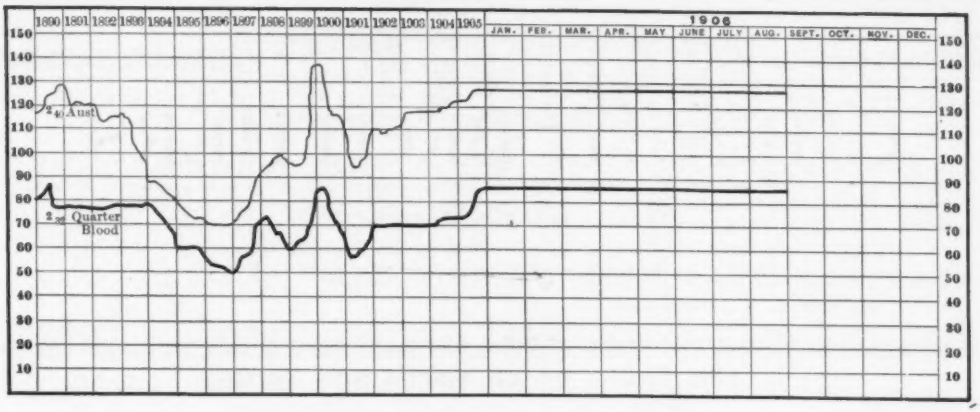

CHART SHOWING RANGES OF PRICE OF WORSTED YARNS.

is that worsted yarn has been cut out of the warps and colored cotton yarn substituted. The weavers state that the use of cotton was their only salvation as they were obliged to meet the demand of the buyers for lower priced cloth. One large dress goods weaver produced invoices for various amounts of cotton yarn, which has displaced 50,000 pounds of worsted yarn. This certainly is to be the banner season in the use of cotton.

While the outlook for English spun yarn is not pleasing, the condition of the French-spun spinners is decidedly better and more prosperous. The use of French-spun filling for mercerized worsteds is universal and a large amount of this cloth has been sold. The spinners are booking some good-sized orders. After the first of September deliveries for this yarn will begin and will show a good business at firm rates during the light weight season. The hosiery knitters and underwear knitters are very busy and are using much French-spun yarn. To be sure some of the yarn sold these knitters is made with a large percentage of cotton, but the spinning machinery is all employed. It is predicted that another season will end the cheap period and a better class of fabrics will be required. The weavers buying English-spun yarn are ordering in small quantities as it is believed that the high water mark has been reached.

It may be that later an extensive demand will be the outcome of the waiting policy of buyers of cloth. This was the case of the knitters where buyers kept off the market as long as possible. Some of the English spinners on mixes are busy. Prices are well maintained and must be until the price of wool has been materially reduced. Much yarn has been sold in the past to one very large manufacturing concern, but as this company has increased its spinning capacity materially much of the yarn sold in this direction must find new outlets. The spinners can make no lower prices for yarn unless the price of the raw material is reduced, but at present there is no indication of a break in prices and none can be expected until after the first of the year. The combers are fairly well employed and prices for tops are firmly maintained.

The light weight season always has been the good end of the business and without doubt this season will be no exception. Undoubtedly a good business will result as the season develops. The present month always shows poor returns; many are out of town on vacations.

We quote:

2/40s Australian	1.28
2/40s Delaine	1.23
2/36s 1/4 to 3/8 Blood	1.00
2/32s 1/4 Blood	.85
2/20s 1/4 Blood	.82

Woolen Yarn.

Spinners continue busy and have all their machinery employed on full time. The business is largely on work for knitters and hosiery manufacturers although much yarn is being made to substitute for worsted yarn in the light weight fabrics now on the market. Within the next sixty days, when the overcoating manufacturers begin to require yarn, it will be difficult for them to get back old spinners. The hosiery knitters are placing large orders for yarn and are employing much outside machinery on commission. The tendency is slightly lower for merino yarn. The knitters throughout the country are very busy and have orders that will easily last until the first of January. A great scarcity of help is developing and in some localities inexperienced workmen are re

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Silks for electrical uses, insulation and special purposes made to order.

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Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Importers of European and Asiatic Raw Silk.

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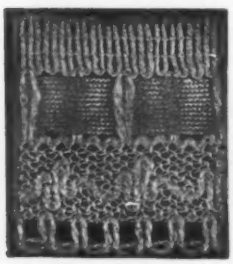
INSULATING AND BRAIDING SILKS.

ORGANZINE, TRAM & HOSIERY SILKS.

Fast Dye Organzines for Woolen Manufacturers a Specialty.

Mills: Bethlehem, Pa., Phila., Pa., Scranton, Pa. New York Representatives, Wm. Ryle & Co., 54 Howard St.—Phila. Office, 4015 Clarissa St., Nicetown.—Chicago Office, 210 Monroe St.—Boston Office, 78 Chauncy St.



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BRAIDS Cotton, Worsted, Mercerized, Cotton and Silk Twilled. **TAPES** Common, Twilled, Superfine and Plain 12 to 35c, white and colors on spools.

YARNS Cops, Skeins, Warps, Tubes and Cones. **THREADS** on Spools, Tubes, Cones, Unbleached, Bleached and Colors for Manufacturers' use.

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Non-Fluid Oils have three distinct characteristics of value: **Economy**—because being non-fluid, they do not waste. Every bit that is fed to the bearings is used for lubricating. **Efficiency**—because, being oils, not greases, they do not gum and clog the bearings and cause increased friction. **Reliability**—Because the ingredients are the best that money will buy and our formulae have been tested by 12 years service.

Samples Free. Write for our booklet on improved mill lubrication.

NEW YORK & NEW JERSEY LUBRICANT COMPANY,
Dep't H. 14-16 Church Street, New York City.

ceiving the pay of skilled workers and are being taught the use of the various machines. To show how busy the mills are, the United States government called for bids for a very large underwear order—over 200,000 pieces—and out of all the mills in the country on this class of work only two bid for the contract and it was awarded half to each mill.

The manufacturers show a hesitancy in placing orders, but it is undoubtedly a fact that after the holiday season is over many orders for yarn and different grades of wool must be placed. Large quantities of noils are being used and it may be said right here that noils are the cheapest class of stock on the market. Many substitutes will be used the coming season to displace wool and many orders are being placed for this class of stock—thread waste, noils, garnetted stocks of all kinds. Anything to cheapen the cost of the fabric. Thread waste is being sold from 65 to 67 cents on the finer grades.

Australian lamb's wool is still in good demand with but little in the market. While it is believed that lamb's wool next year will be lower on account of the great Australian clip, yet there is but a small supply of lamb's on this market and in consequence lamb's wool is higher by 2 cents per pound than at an earlier period in the year. Wool that has sold at 76 cents per pound is easily worth 78 to 80 cents per pound today. The spinners of sale yarn are beginning to get good orders from dress goods weavers manufacturing broadcloth and it is undoubtedly a fact that the coming cloth is broadcloth for ladies' dress goods. Weavers are making cheap Panama cloth out of cotton warps and that means the end of that fabric for the present. All the better suits are being made of broadcloth and that will give employment to many woolen yarn spinners as but few of the dress goods weavers have woolen spinning machinery.

The rubber boot lining trade requiring woolen spun yarn continues slow as but little lining is being called for on account of the slow business of last year on rubbers. There is a continued increased demand for 2-ply and 3-ply woolen yarn for novelties in sweaters, leggings and other articles and the woolen yarn spinners can look forward to a good steady business for some time to come.

G. M. BLAISDELL, Pres. and Treas. G. A. BLAISDELL, Vice-Pres. and Sec'y.
Established 1860—Incorporated 1893.
THE S. BLAISDELL, JR., CO.,
COTTON, EGYPTIAN PERUVIAN
American Long Staple a Specialty. Shipments direct to mill from Egypt, Peru and all American Southern Points.
CHICOPEE, MASS.
Cotton Waste Purchased on Yearly Contract from Mills.

WILLIAM B. CHARLES,
Cotton Yarns,
Cotton Cloth,
Silesia, Sateens,
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AMSTERDAM, N. Y.
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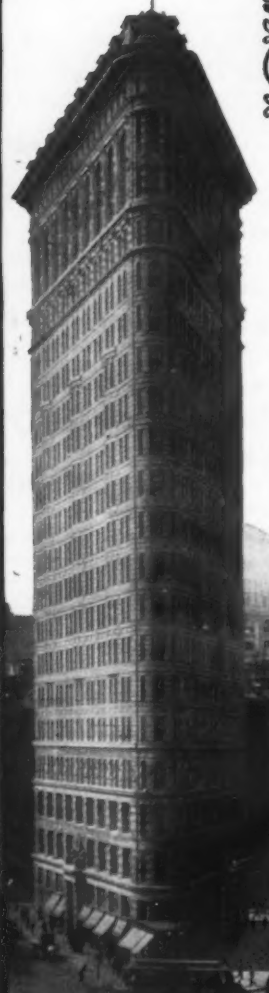
Carpet Backing and Rug Yarns a Specialty.
ARCOLA MILLS,
Main St., foot of Centre St., Manayunk, Philadelphia.

Knitting and Weaving
YARNS.
Cones, Cops, Warps, Skeins,
Single, Double, Three-Ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.
EDWARD S. HYDE,
226 CHESTNUT STREET,
Philadelphia, Pa.

The Barrett Specification ROOF



WHEN we make the statement that a great majority of all the important buildings and manufacturing plants of the country are roofed with Coal Tar Pitch and Felt along the lines advocated in The Barrett Specification, it would seem as if no higher commendation could be secured.

Yet added evidence of its value is the fact that the foundation walls and cellars in most of these structures are also waterproofed with the same materials. The famous "Flat-Iron" Building, illustrated herewith, is an example of this.

THE BARRETT SPECIFICATION ROOF is the most suitable, satisfactory and economical known. The practical application of this fact is daily demonstrated by every reputable roofing contractor in that he will guarantee such a roof *absolutely* for at least ten years, as against the *qualified and provisional guarantee* given with other roofings.

Tin, and other metal roofs, require coating or painting every two or three years. Failure to do this, either through oversight or false economy, causes such roofs to corrode, rust and leak. Thousands of dollars worth of merchandise are destroyed annually through leaky roofs.

The Barrett Hand Book covering the subjects of roofing and waterproofing will be mailed free on application.

BARRETT MANUFACTURING COMPANY

New York Philadelphia New Orleans Allegheny
Cleveland Chicago St. Louis Cincinnati
Kansas City Minneapolis Boston

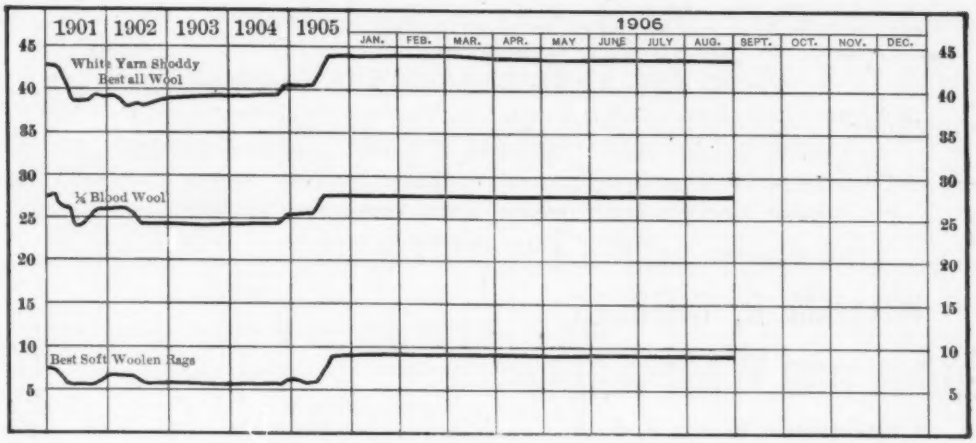


CHART SHOWING RANGE OF PRICES OF SHODDY, RAGS AND NOIL.

Rag and Shoddy Market.

"Nothing doing" has been the rule in these markets since our last report. A duller market is not recalled by the oldest dealer in the trade. Prices, however, have remained unchanged, as the general opinion is that lower prices would not increase sales. Rag dealers and shoddy manufacturers are looking forward to the opening of the heavy weight season with the expectation that an increased demand will develop then. The present dulness extends to all grades.

Woolen waste shares in the depression, but there is a scarcity of desirable lots. Cotton waste is lower in sympathy with the decline in raw cotton.

We quote as follows:

SHODDIES AND EXTRACTS.

White yarn, best all wool	44-47
White knit, all wool, best fine	35-40
White knit, No. 2	30-35
Light yarn, extra fine	30-35
New pure indigo blue	28-30

Merino.

Fine light, all wool	24-27
Medium light, all wool	15-17
Fine black, all wool	25-27
Fine dark, all wool, best grade	22-25
Medium dark, all wool, No. 1	18-20
Medium dark, all wool, No. 2	15-16
Red knit stock, strictly all wool	20-22
Red flannel, all wool	20-22
Dark blue for hosiery, strictly all wool, No. 1	20-22
Dark blue for hosiery, not all wool, No. 2	15-18

WOOLEN RAGS.

Fine merchant tailors	10-11
Choice light colors	13-14
Browns	12-13
Blacks	9-10
Fine blues, plain	9-10
Fine dark	12-13
Medium dark	7-8

Worsteds.

Blue	15-17
Black	21-22

Serges.

New black	16-18
New blue	14-16

Flannels.

New scarlet	19-20
New blue	15-16
Cloakings	3-4

SOFTS AND KNIT STOCK.

Soft woolens, best	9-9½
Old white flannels	23-24
White flannels, No. 2	11-12
Old red flannels	13½-14
Light blue flannels	7½-8½
Old blue flannels	9½-10
Old plaids	7-8½
White stockings	24-25
White hood stock	24-25
Clear hoods	9-10
Blue stockings	8½-9
Fancy stockings, No. 1	9½-11
Gray stockings	10½-11
Black stockings	11-12
Knit stock comforters	7-8
Red knit	13½-14
Light gray knit	10½-11
New light fancies	14-15
New fancies	11-12

Merinos.

Light, fine	16-17
Light, coarse	7¼-7½
Fine, dark	14½-15½
Coarse, dark	6½-6¾
Blue	11-12
Blue—seamed	
Black—seamed	15-16
New black	18-20
Small	4¼-4¾
Bunting	7-10

L. J. WING MFG. CO., 136 Liberty St., N. Y.,

Manufacturers of

WING'S DISC FANS, EXHAUSTERS, BLOWERS,

High Speed Steam Engines, Electric Motors, Acetylene Generators, Laundry Irons, etc. Also

WING'S FAN AND TURBINE ENGINE COMBINATION

For Forced Draft for Boilers, Humidifying, Removing of Steam, Vapors, etc. Something New and Valuable.

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Cotton and Wool Wastes

Amsterdam, N. Y., U. S. A.

COTTON YARNS.

Contracts made with Cotton and Woolen Mills for Yearly Waste Production. Correspondence solicited. Shepperson's Code, 1878. Cable Address "Charles."

Boston Office: 200 Summer Street.

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Carbonized Stock a Specialty.

FLOCKS

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MILL SUPPLIES
Amsterdam, N. Y.
SOLE AGENT FOR
Adams' Patented Latch Needles

FLOCKS.

Shear, fine white, all wool	10-12
Fine indigo blue, all wool	7-8
Fine black and blue, all wool	6-7
Fine dark, all wool	2½-4
Gig, fine, all wool	2-3
No. 1 black, all wool cut	6-10

COTTON WASTE.

No. 1 Spinners	10-10½
No. 1 Machine Cop	8¼8¾
No. 2 Machine Cop	7½-8
No. 1 Cop	8½-9
No. 1 Card	8-8½
No. 2 Card	7½-8
No. 1 Oily Card	4½-5
No. 2 Oily Card	3½-4
Peeler Combing	10-10¼
Egyptian Combing	10-10¼
No. 1 Linters	6-6½
No. 2 Linters	5¼-5¾
White Clips	4½-5
Colored Clips	1½-2¼

Dyestuffs and Chemicals.

Acids.

Acetic, 100 lbs.	2.00-2.50
Citric, domestic	45-45½
Oxalic	6-6¼
Sulphuric, 60 deg., 100 lbs.	1.00-1.20
Muriatic, 18 deg.	1.15-1.75
Tartaric crystals	28-28¼

Miscellaneous Chemicals.

Acetate of lime, gray, 100 lbs.	2.35-2.40
Alum, lump	1.75-1.80
ground	1.85-1.90
powdered	2.75-2.80
Aqua ammonia, 16 deg.	3¼-4
Ammoniac, sal., gray	5¾-6⅛
Borax, bbls.	7½-8½
Brimstone, crude, foreign ton	22.12½-22.62½
Copperas	52½-65
Cream tartar, crystals	22½-22¾
Fuller's earth, lump, 100 lbs.	
powdered	80-85
Glauber's salt	40-45
Potash, chlorate, crystals	8½-9¼
powdered	8¾-9½
carbonate	3½-4
Soda ash, carbonate, 48 per cent.	1.20-1.30
high test	1.00-1.25

FIRE, LIGHTNING, WINDSTORM.

The HOME INSURANCE COMPANY NEW YORK

Organized 1853. MAIN OFFICES, 56 CEDAR ST.

Cash Capital, $3,000,000.

ASSETS January 1st, 1906	$21,239,052
LIABILITIES (including Capital)	12,518,551
NET SURPLUS OVER ALL LIABILITIES	8,720,501
Surplus as regards Policy-holders	11,720,501
Losses Paid Since Organization Over	99,000,000

HOME losses at San Francisco cannot exceed $2,000,000. Note amount of net surplus.

HOME Policy-holders everywhere have protection, which is sure, notwithstanding conflagrations anywhere.

IS prepared to entertain liberal lines on Sprinkler-Equipped and Modern Improved risks generally, having a special department for the consideration of such business.

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CLARENCE A. LUDLUM, Ass't Sec'y. HENRY J. FERRIS, Ass't Secretary.

Soda, bicarbonate, English	
American	1.30-1.70
Soda, caustic, domestic, 60 per cent.	1.85-1.90
Sal. English	85-90
Sal. American	70
Sulphate, alumina	1-1¾
Vitriol, blue	6-6¼

Dyestuffs.

Acetate of soda	4¼-4½
Acid ,picric, best crystals	22-27
tannic, commercial	32-35
Albumen, egg	53-80
blood	20-27
Alizarine, red	15½-16½
Aniline, oil	11-11½
salt crystals	9½-10
Antimony salt, 65 per cent.	24½
Bichloride of tin, 50 per cent.	10½-11¼
45 per cent.	9½-10¼
Bichromate of potash, American	8⅛-8¼
Bichromate of soda	6¼-6¼
Bisulphate of soda	80-1⅜
Cutch, mat	
boxes	6¾-7½
Dextrine, imported potato	5¾-7
corn	2.75-2.90
Divi-divi, ton	55.00-65.00
Flavine	23-40
Fustic, stick, ton	17.00-20.00
young root	45.00
Gambia	4.00-4.125
Hypo. of soda, Am. bbls. cwt.	1.40-1.50
Indigo, Bengal, low grade	52½-55
medium	60-65
high grade	75-85
Kurpah's	47½-60
Gautemala	35-70
Manila	43-45
Madras	42-45
J. (Synthetic)	18-20
Indigotine	95-1.80
Logwood, stick, ton	16.50-21.00
roots	15.50-16.50
Madder, Dutch	12-14
Muriate of tin, 36 degrees	9-9¼
52 degrees	15-15¼
Nitrate of iron, commercial	1⅜-1½
Nutgalls, blue Aleppo	23-25
Persian berries	7
Phosphate of soda	1.80-2
Prussiate of potash, yellow	15½-16
Quercitron, ton	20.00-22.00
Starch, corn, pearl, bbls.	2.35
corn, pearl, bags	2.20
potato	3¼-4
rice	6½-7
wheat	4¾-5¼
Stannate of soda	10-20
Sumac, Sicily, No. 1, ton	52.00-54.00
Sicily, No. 2, ton	50.00-52.00
Tapioca flour	2⅜-4
Tin crystals	24¼-27
Tumeric, Madras	5¾-6
Zinc dust	5⅝-5¾

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of superior quality for power transmission and the conveying of materials. Our large stock enables us to make prompt shipments.

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Specialty in the Treating of Silk and Wool Fabrics, such as Eolliennes, Crepes and Henriettas and all high class wool tissues like Batiste, Voiles and Foules. Also, Cotton and Wool Goods, Mohair Linings and Lastings.

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Fast Colors for the Woolen Trade. Capacity 20,000 lbs. per day.
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Pawtucket Dyeing and Bleaching Co.

Bleachers and Dyers of COTTON YARNS and STOCKINET

Office with Blodgett & Orswell Co., Manufacturers of Glazed Yarns.

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Dyers of Skein Silk
FOR ALL TEXTILE PURPOSES

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Pure Dye and Weighted. Bright and Souple.
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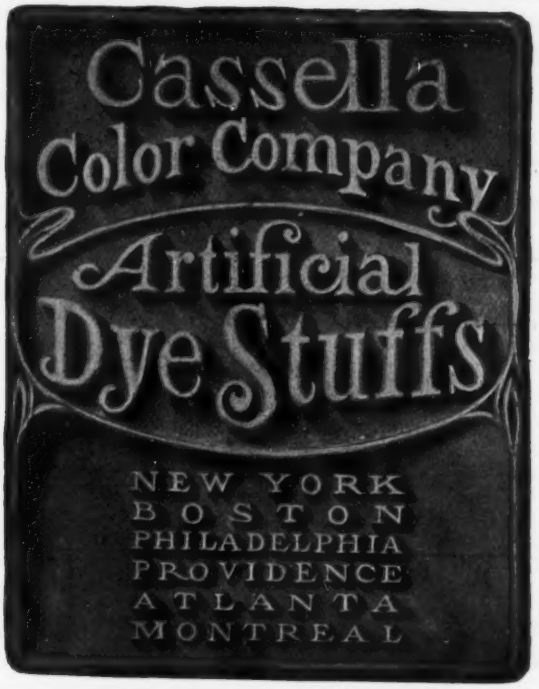

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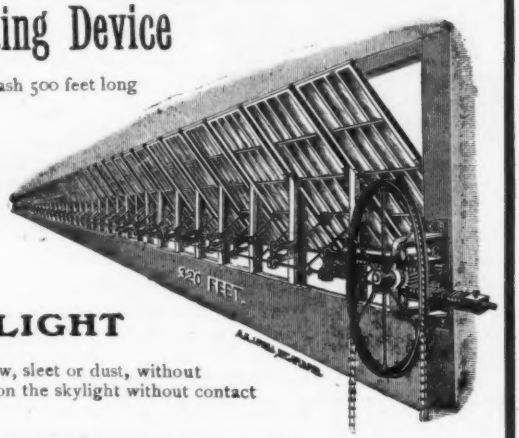

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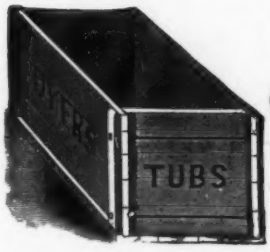

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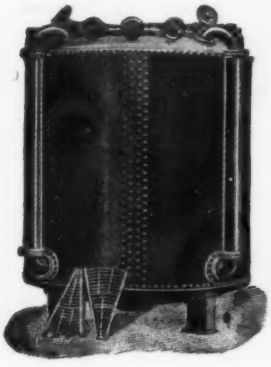

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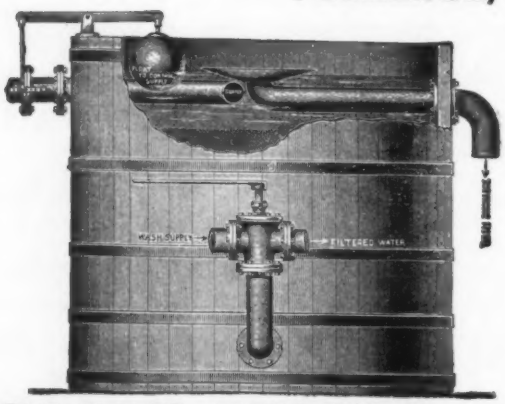

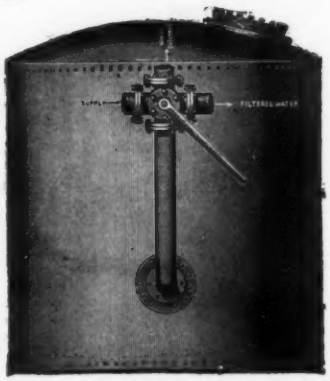

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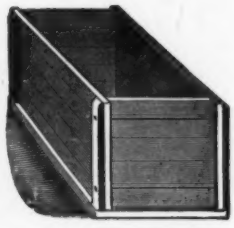

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VACUUM MACHINE.

This machine will dye large, hard twisted, twine cops. It will dye or bleach any size of cotton cops. It will scour wool or worsted cops, cheeses and tops. It will scour or dye waste cops. This is a good machine to work in conjunction with the Vacuum and Pressure Machine for washing off, etc.

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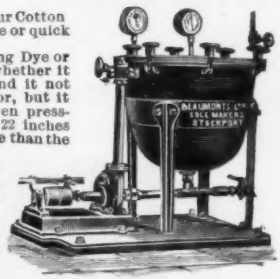
This machine will Dye, Bleach, Size and Scour Cotton Hemp, Woolen, etc., in the form of Cop, Cheese or quick traverse bobbins, any thickness or length.

This Machine will circulate absolutely boiling Dye or Size Liquor through every fibre of the yarn, whether it be cop or cheese which is under treatment, and it not only circulates this boiling Dye or Size Liquor, but it forces it into the fibre of the yarn under an even pressure of 10 lbs., and this is more than equal to 22 inches of vacuum; it is **three times** more effective than the ordinary Cop Dyeing Machinery.



This machine will dye evenly and thoroughly through every fibre of the Cops while the spare Cop plate is being refilled with Cops; **in fact it will do this in six minutes.**

Can be depended upon to dye a perfectly even shade all through the yarn, and will dye the most delicate colors. It will dye silk Cops or treat them with any necessary liquor. It will scour or dye wool tops. It will scour or dye large hemp cops and cheeses. It will scour and dye waste cops. We are the Patentees and Sole Makers.

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We supply Two Sets of Skewers and Two Cop Plates with the Machine, whether it is for Weft Cops, Twist Cops or Cheeses.

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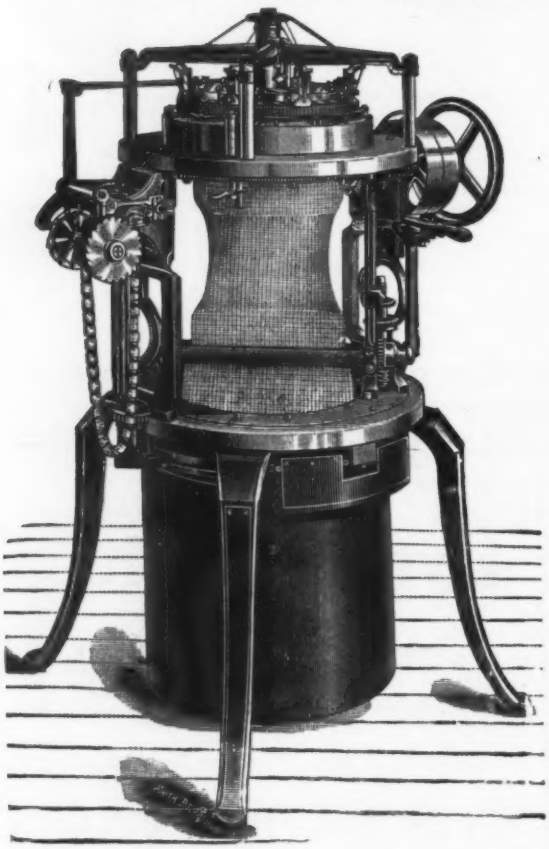

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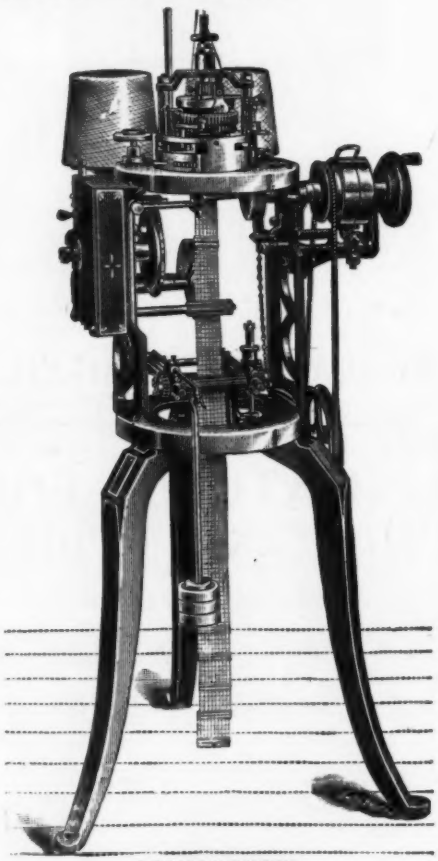

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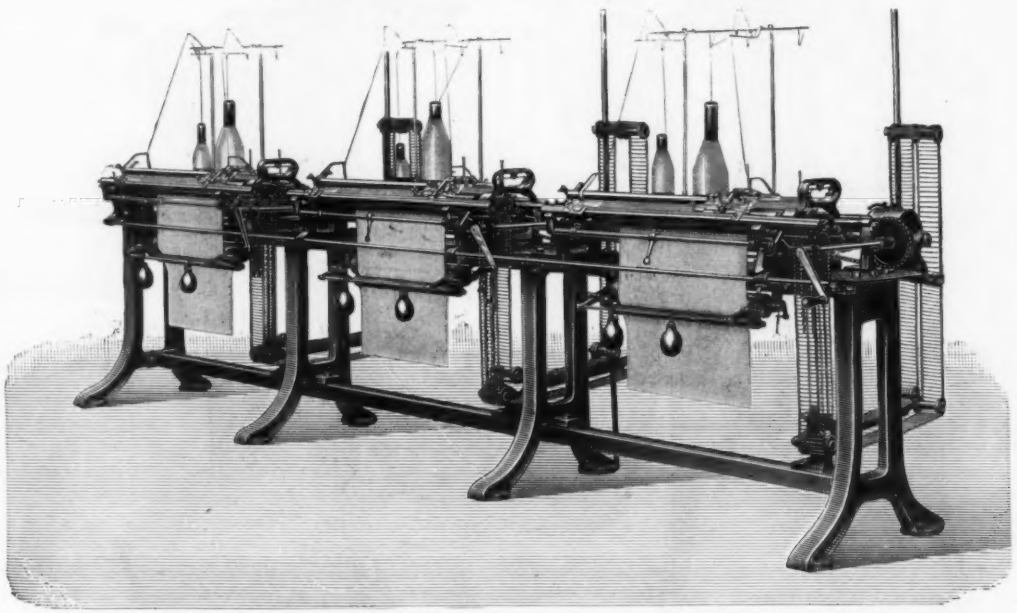

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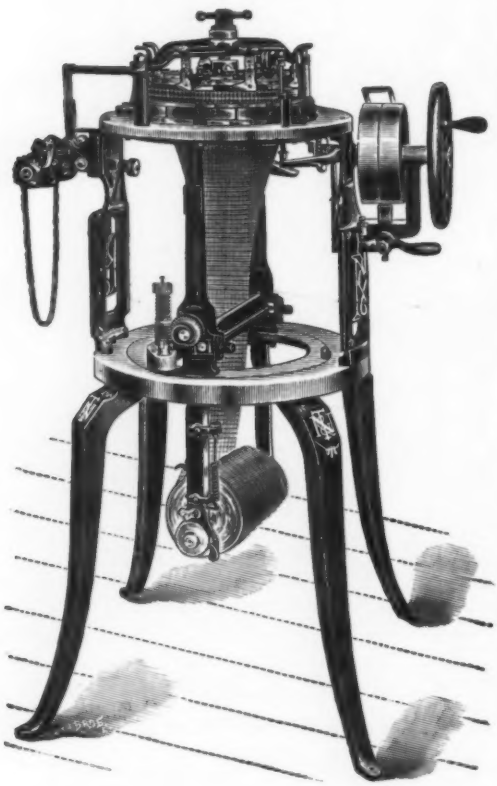

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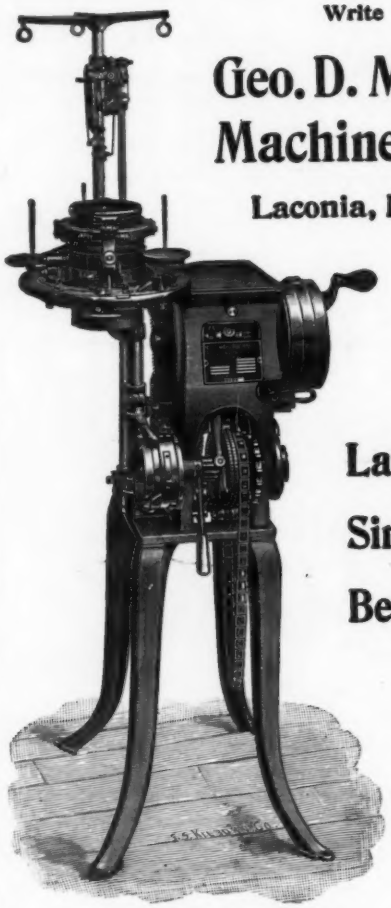

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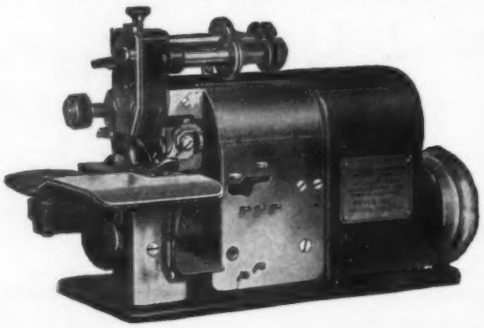

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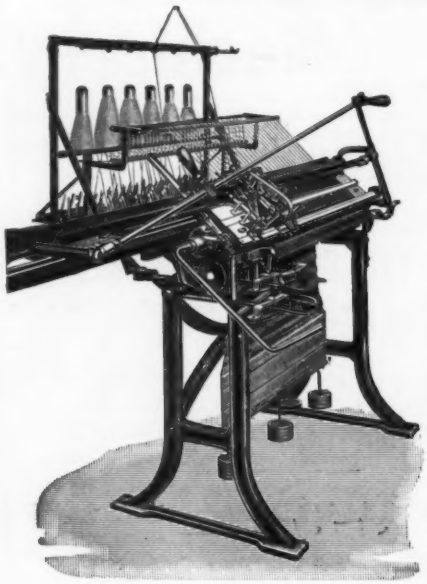

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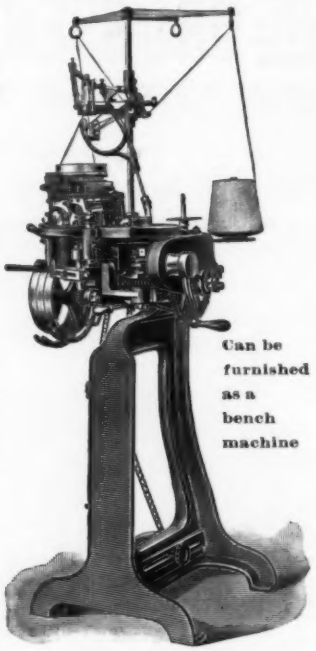
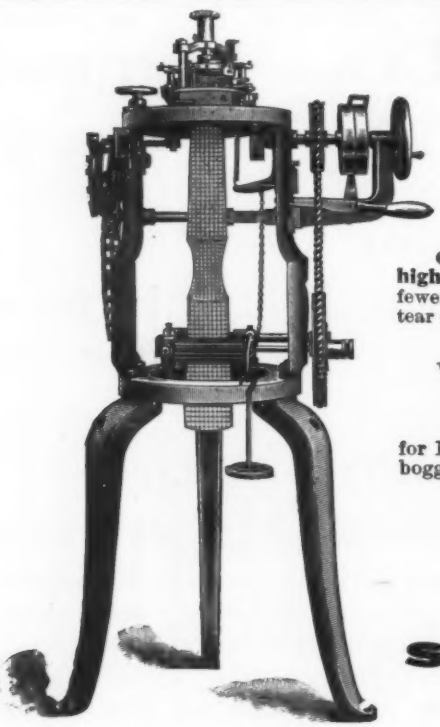


Can be furnished as a bench machine



High Speed Rib Knitting Machinery.

Our latest model machinery has been designed to run at very high speed, giving large production. This is accomplished with fewer seconds, less breakage of needles, less jar and wear and tear on machines than has been customary at lower speeds.

We also make Special

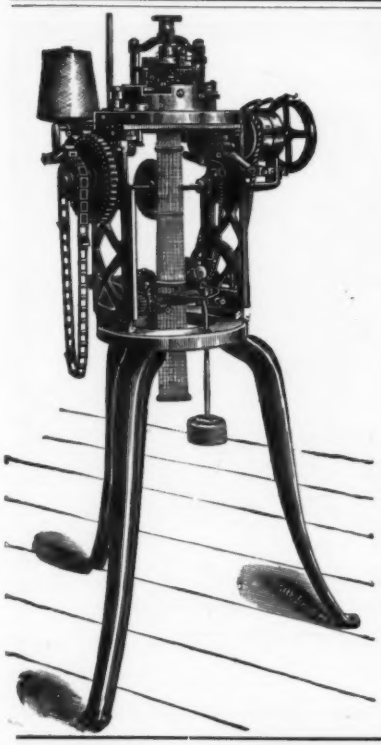
STRIPING AND DESIGNING MACHINES

for Fancy Golf Stockings, Bathing Suits, Sweaters, Toques, Toboggan Caps, Skirts, etc.

Our Machinery gives large production at low cost and enables manufacturers to meet the market always and make a profit.

STAFFORD & HOLT,

LITTLE FALLS, N. Y.



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213-215 Race Street, Philadelphia, Pa.

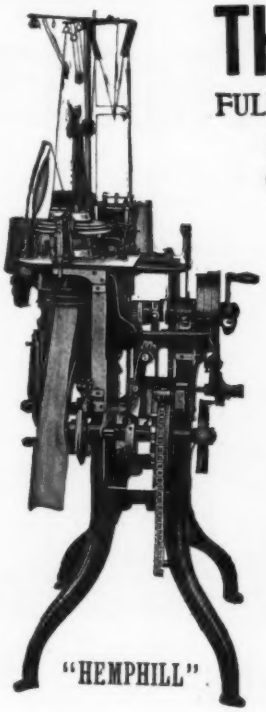
BUILDERS OF

Knitting Machinery

For HOSIERY and UNDERWEAR.

Complete Estimates Furnished. Send for Particulars.

The cut shows our Improved Automatic Ribber with Welt and Slack Course for Half Hose, Tops and Ribbed Legs.



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THE TWO LEADERS

FULLY AUTOMATIC HOSIERY KNITTERS

FOR MAKING ALL KINDS AND GAUGES OF SEAMLESS HOSIERY

One with **GEARS**, the other with **CHAIN** for pattern mechanism, to meet the various tastes of different manufacturers.

Both used and approved by leading hosiery manufacturers.

Both contain all the well-known essentials demanded of first-class knitting machines.

With these two machines we can supply all manufacturers' possible wants in the best possible manner.

Write us for further particulars and prices.

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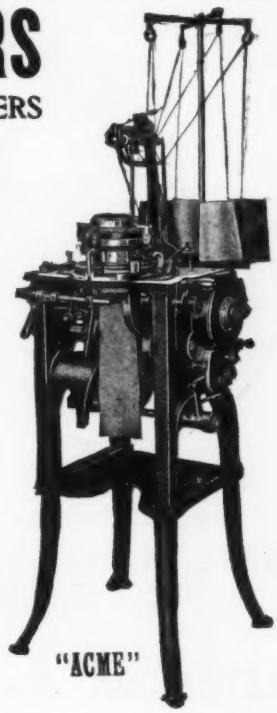

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Meadow and Washington Streets

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Full Automatic Knitters

With or without **Transferring Device**

ALL SIZES AND GAUGES, 2 1-4 INCH TO 4 INCH

CIRCULAR KNITTING MACHINES

Either plain or full automatic, with stop motions complete. 4 to 24 feeds for

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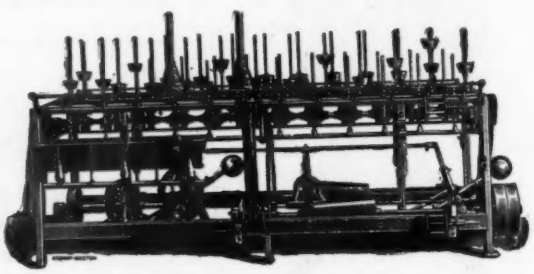
Automatic Racking and Striping Machines for Sweaters, Cardigans, Collarettes, Cuffs and Anklets.



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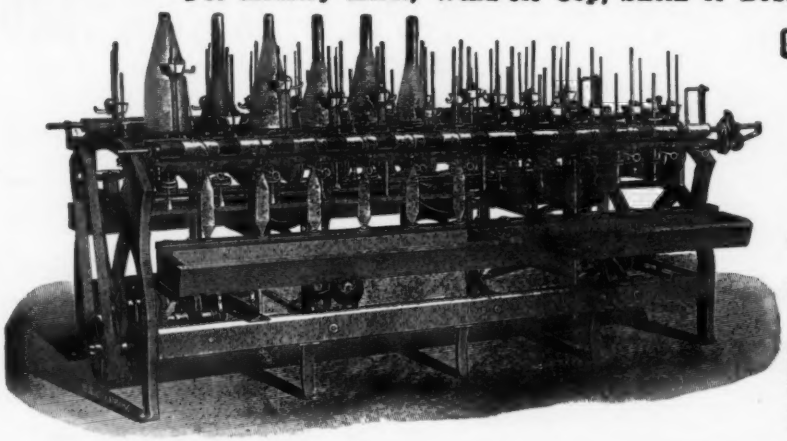

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Builders of the

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Upright Spoolers,

To Spool from Cop, Skein or Bobbin.

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Ring Dresser, Spooler and Reel Spindles, Cop Skewers, Warp, Spool, Spooler, Guides, Bolsters and Stops Made and Repaired at Short Notice.

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Sole Agent for United States and Canada

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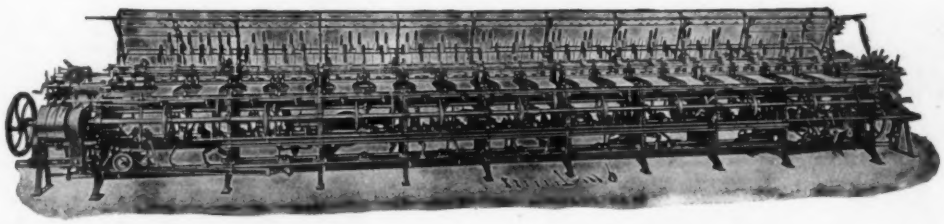

"Awarded Gold Medal at World's Fair, Paris, 1900,

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COTTON-HILSCHER HIGH SPEED SYSTEM, 68 courses per minute.

COTTON SYSTEM, for horizontal stripes up to 6 colors, Scotch plaids and vertical stripes, lace through the narrowing, split, etc., etc.

COTTON SYSTEM, wedge heel; this machine manufactures entire full-fashioned ladies hose or half hose and dispenses with the foot machine.

COTTON SYSTEM, newest construction. The new machine knits the entire hose or half hose complete down to the toe, it makes French heels and French feet.

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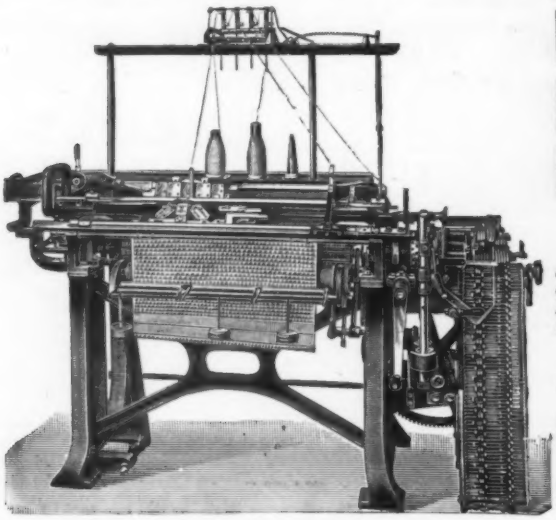
Machines can be seen in operation at above address.



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For High-Grade Sweaters, Jerseys, Etc. in latest plain and colored patterns.

Most durable, simplest construction! Easy to operate and adjust! Recognized as the Best in the market. One operator attends to 3 of these machines! Only reliable machine for above articles.

HIGH SPEED! LARGE PRODUCTION! IN USE EVERYWHERE!

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GAS ENGINES for city or country
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SUCCESSORS TO

PEPPER MACHINE WORKS

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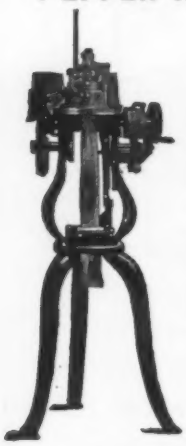
Manufacturers of



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INCLUDING

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KNITTING MACHINE.

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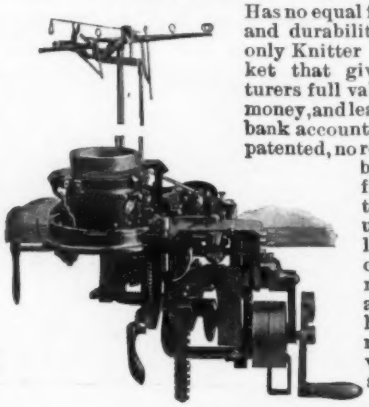

Has no equal for simplicity and durability. It is the only Knitter on the market that gives manufacturers full value for their money, and leaves a swelled bank account. It is fully patented, no royalty to pay; built in sizes from 2½" up to 6"; from 42 up to 220 needles in 3¾" machine. Knits men's, ladies' and children's hose, plain or ribbed. Runs with one single belt. Automatic tension in heel and toe. Send for prices and particulars to

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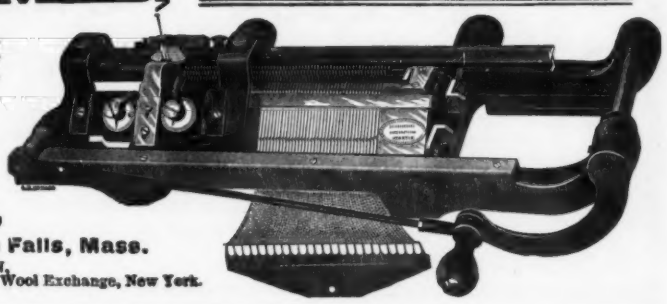

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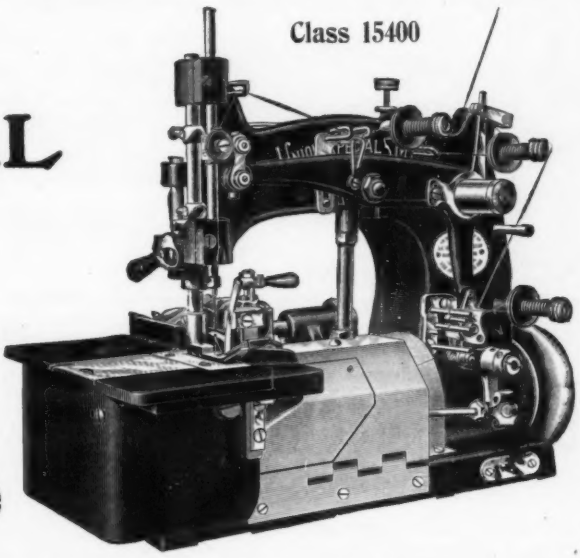
Class 15400



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By increasing production of operators, these machines reduce cost. Expenditure for Union Specials always means a profitable investment.

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Full Automatic Knitter

FOR ALL KINDS AND GAUGES OF SEAMLESS HOSIERY.
RANGE ON HALF HOSE AND LADIES FROM 260 NEEDLES DOWN.

3-4 AUTOMATIC KNITTER

With Lace Effects.

Exclusive rights to BROWN'S LACE ATTACHMENT.

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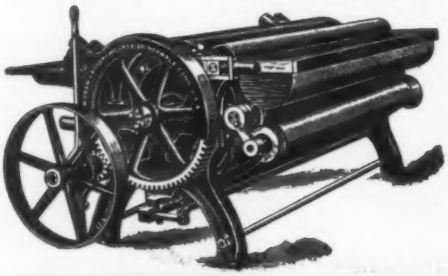
AUTOMATIC IRONING and PRESSING MACHINE for KNIT GOODS.



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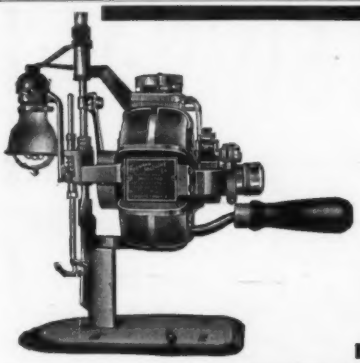

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WHY?

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Our Knit Fabric Cutter

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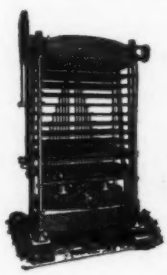

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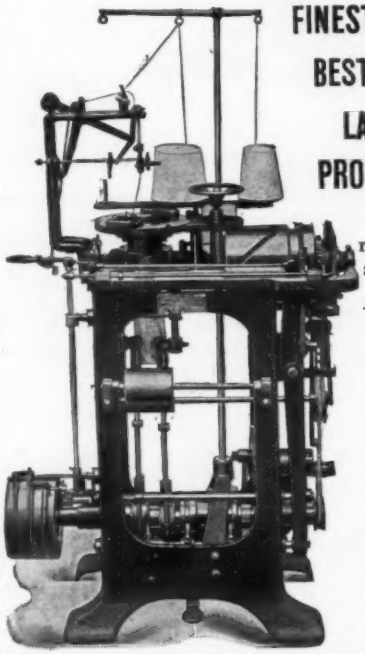

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All automatic.

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The book contains about 100 pages with 20 illustrations, and should be in the possession of every person having to do with cotton in any state, from the seed to the retail purchaser.

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considers first cost as *only one* of several important considerations, *actual results attained* being the real test of value. This is why so many manufacturers

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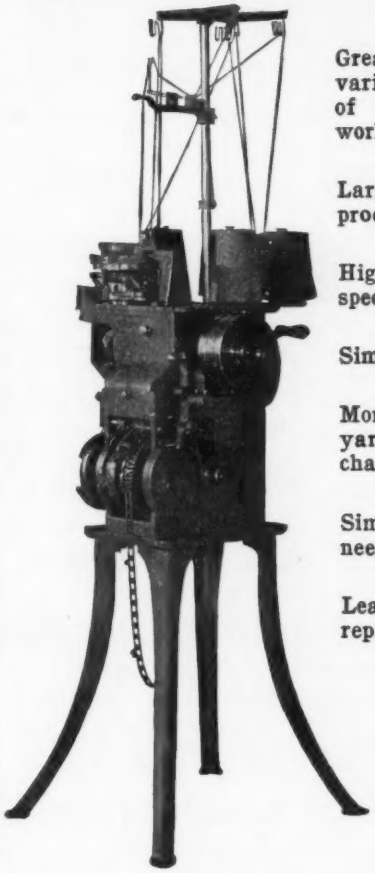

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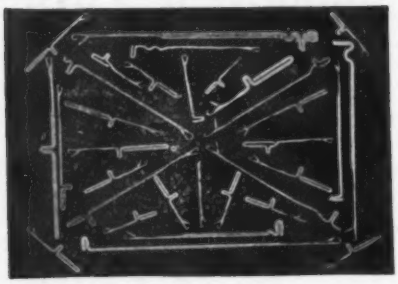

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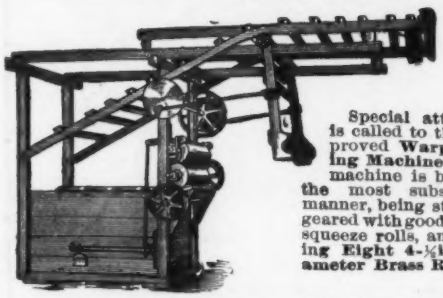
The Reliance Warp Dyeing Machine.



Special attention is called to this improved **Warp Dyeing Machine.** This machine is built in the most substantial manner, being strongly geared with good, heavy squeeze rolls, and having **Eight 4-½in. Diameter Brass Rolls.**

This machine, with our Improved Plater-down has met with marvelous success, and parties desiring machinery of this class, can make no mistake on ours For further particulars and prices, address

CHARLES HART,

Hedge and Brown Streets, FRANKFORD, PHILA.

Good Locations for Cotton and Knitting Mills

are many throughout the territory traversed by the

SOUTHERN RAILWAY

Resources, markets and advantages for manufacturing the raw material are unexcelled. The Land and Industrial Department of the Southern Railway is always ready to advise with manufacturers of textile commodities as to the best locations, placing at their disposal information that is succinct but convincing, dealing with every undertaking from a standpoint beneficial to the manufacturer. Go where you receive the best results is our motto and why we want you to come South.

Inquiries are solicited and attended to in strict confidence. For further information address

M. V. Richards,
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CHARLES COOPER,

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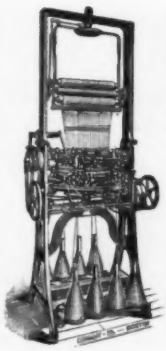
MANUFACTURER OF



Knitting Machinery

Flat and Circular Rib, both Spring and Latch Needle, Plain Circular Machines, Lead or Trick Cylinder, **Spring Needle Cylinder Rib-Top Machines** for making Cuffs, Drawer Bottoms and Shirt Borders.

Spring and Latch Knitting Needles,
Burr Wheels,
Burr Blades, Sinkers, Jacks, etc.

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European Representatives.
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Representatives:
C. J. SIBBALD, 757 River St., Troy, N. Y.
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Boston Wool Exhausters, with Removable Tops.

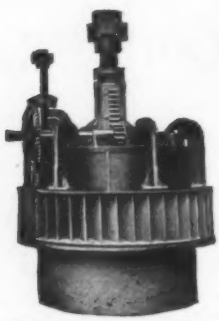
AS USED IN CONNECTION WITH PNEUMATIC CONVEYOR SYSTEM FOR HANDLING WOOL, COTTON, RAGS, EXCELSIOR, JUTE, ETC.

Inlet Side of Right-hand Wool Exhauster. Pulley Side of Left-Hand Wool Exhauster.

This machine is similar in design to the regular Boston Patent Exhaust Fan, but is fitted with a special wheel for handling fibrous materials, and the top is removable.

This latter feature is especially desirable when handling wet or greasy materials or in handling anything, in fact, which would leave a deposit on the inside of fan, as the entire top may readilly be removed for inspection or cleaning without disconnecting either pipe or belt connections.

BOSTON BLOWER CO., Main Office and Works: **Business and Glenwood Sts., HYDE PARK, MASS.**



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MOUNT HOLLY, NEW JERSEY, U. S. A.

RISDON CELEBRATED TURBINE
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LEVIATHAN HINGED GATE TURBINE

On Horizontal or Vertical Shafts.

These Turbines are recognized as the most effective water wheels made. Your inquiries should come direct to us for this class of machinery.

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An EVEN and REGULAR SPEED under all CHANGES of LOAD makes the SAMSON especially desirable for driving all classes of machinery where the output must be UNIFORM in TEXTURE and QUALITY.

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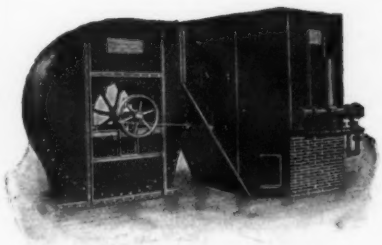

The "ABC" Fan System of Heating and Ventilation provides a constantly changing supply of pure, fresh air, uniformly distributed to every part of the building.

Need a heating system for some new buildings or a better one for your old ones? May we figure with you?

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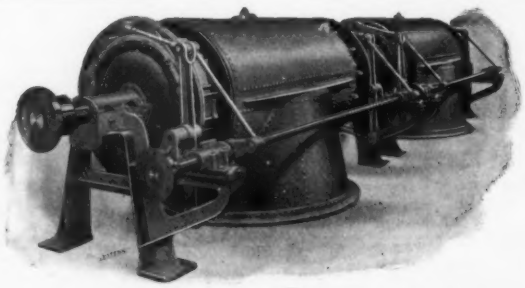

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ADAPT IT TO ALL CONDITIONS.

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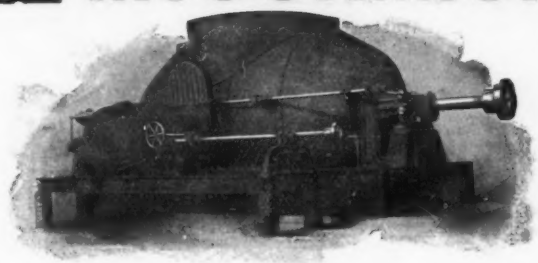

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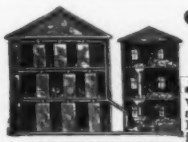

CHARLES H. SCHNITZLER,
Patentee and Sole Manufacturer of
THE PNEUMATIC CONVEYOR
For the handling of wool and cotton stock, rags, excelsior, jute and all kinds of fibrous material, wet or dry. Also spool elevators, steam heating and ventilating, and mill work generally. Blower and fan work a specialty. This conveyor is patented. Beware of infringement.
SATISFACTION GUARANTEED. Patented Oct. 15, 1889.
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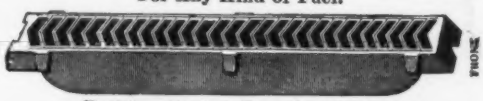

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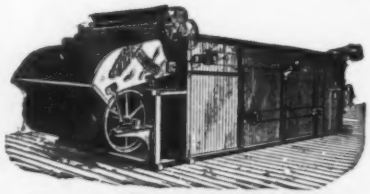
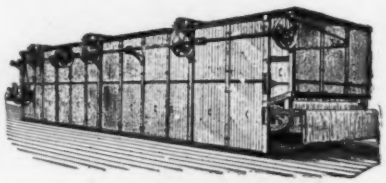
For Cotton Stock, Wool Stock, Rags, Yarn, Cloth
Underwear, Stockings, etc.



Automatic Cotton or Wool Stock Dryer.



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Complete Carbonizing Outfits for Wool, Rags or Cloth.

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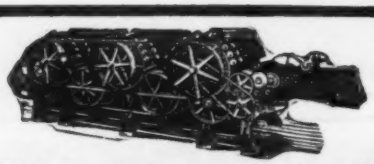
Hancock and Somerset Streets, PHILADELPHIA, PA., U. S. A.



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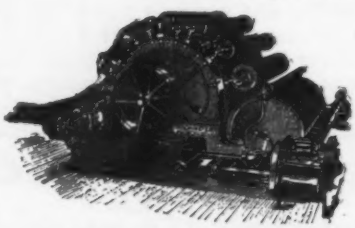
For reducing to Fibre Cotton and Wool Waste, Cloth Clippings, Etc.



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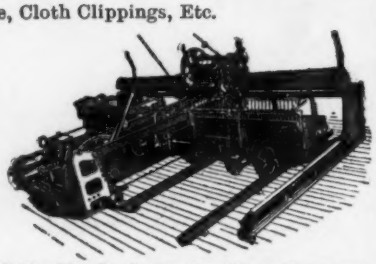

Including Rag, Wool and Burr Pickers, Wool, Worsted and Shoddy Cards, Mules, Yarn Twisters, Warpers, Dressers, Spoolers, Etc.

Complete Equipment for Manufacturing Cotton Batting for All Purposes.

Special Carding and Spinning Machinery for manufacturing Yarn from such low grade stock as Mill Sweepings, Linters, Etc.

We reclothe or furnish new Metallic Toothed Cylinders and Rolls and relagg or furnish new Cylinders for any make of Rag Picker.

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YOU can judge the character and interest of the consumers who are reached by a magazine by the character and "interest" of the magazine itself. The Delineator, The Designer, and The New Idea Woman's Magazine, in comparison with all other ways of advertising, can prove their better value, as to Cost, Quantity, and Purchasing Power of their circulation. Even if these points of comparison showed only equal value, instead of better value,—there remains one important fact which alone is enough to decide any Textile Advertiser in favor of these magazines—the Character of their circulation.

Who trademark their product, (part of it or all of it, and who—

—(Instead of letting their profits depend solely on current prices fixed by competition)

—(or solely on a selling agent's talent)

—devote part of their selling effort to create for their trademark a Consumer-Demand

—which makes it possible for the manufacturer to sell more goods, to sell at less expense, and with less uncertainty as to profits,—

—and which, increasing steadily from year to year, attaches to the trademark a

Permanent Good-Will

Many magazines serve in a minor way their readers' interest in Fashion, Dress and Household Textiles. But *these* magazines—The **Delineator,** The **Designer,** and The **New Idea,** serve that kind of interest first, foremost, and most thoroughly. *For that reason* they are bought and read. That fact makes them

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Talk it over with your advertising agent. If you have no agent, or if your agent is not prepared to discuss this vital point of advertising policy as thoroughly and definitely as it deserves — talk it over with me.

W N Black

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The Delineator. The Designer. The New Idea Woman's Magazine.

The Butterick Trio goes to more than 1,600,000 homes,—about Ten Millions of readers. Magazines that pass from hand to hand and from home to home, among women, who buy at retail stores, for families.

The Butterick Trio

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Both Close and Open wind.

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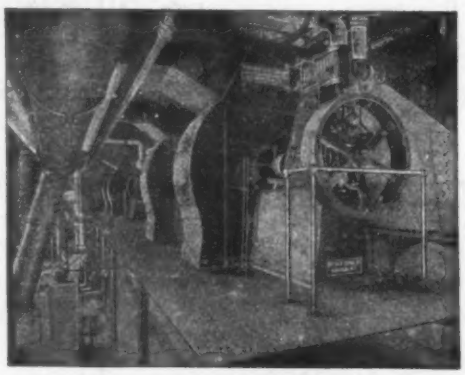
The FOSTER WIND CONE makes a Perfect Knitting Package.

BUFFALO MECHANICAL DRAFT



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MECHANICAL DRAFT means more steam with less coal and less smoke. More boiler horse-power with less outlay. More flexible and positive than natural draft. Provides for future extensions of boiler capacity. Burns low-grade fuel. No tall chimneys. MECHANICAL DRAFT outfits are designed, installed and guaranteed by this company.

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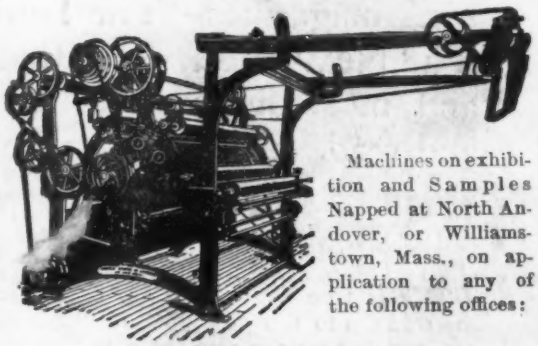
Own the principal patents on Napping Machines, representing the latest French, English and American Patents.



Machines on exhibition and Samples Napped at North Andover, or Williamstown, Mass., on application to any of the following offices:

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Builders and Selling Agents, ... North Andover, Mass.
Geo. S. Harwood & Son, 53 State St., Boston.
H. H. HEAP, Treasurer and General Manager
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VALVES AND FITTINGS

"Walmanco" Pipe Flanges,
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